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OF

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EDITED BY RICHARD SOUTH, F.E.S.

WITH THE ASSISTANCE OF

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"A grand and almost untrodden field of inquiry will be opened, in the causes and laws of variation, on correlation, on the effects of use and disuse, on the direct action of external conditions, and so forth. The study of domestic productions will rise immensely in value. A new variety raised by man will be a more important and interesting subject for study than one more species added to the infinitude of already recorded species. Our classifications will come to be, as far as they can be so made, genealogies; and will then truly give what may be called the plan of creation. The rules for classification will no doubt become simpler when we have a definite object in view. We possess no pedigrees or armorial bearings; and we have to discover and trace the many diverging lines of descent in our natural genealogies, by characters of any kind which have long been inherited. Rudimentary organs will speak infallibly with respect to the nature of long-lost structures. Species and groups of species which are called aberrant, and which may fancifully be called living fossils, will aid us in forming a picture of the ancient forms of life. Embryology will often reveal to us the structure, in some degree obscured, of the prototypes of each great class."—DARWIN, '*Origin of Species.*'

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THE PIGMENTS OF THE PIERIDÆ: A CONTRIBUTION TO THE STUDY OF EXCRETORY SUBSTANCES WHICH FUNCTION IN ORNAMENT.*

By F. Gowland Hopkins,
Demonstrator of Physiology and Chemistry at Guy's Hospital, London.

The paper deals with the chemistry of the wing pigments of that group of butterflies known as the Pieridæ, and demonstrates the excretory nature of these pigments. The following are the salient facts dealt with, most of the statements being based on original observations described in the paper:—

1. The wing scales of the white Pieridæ are shown to contain *uric acid*, this substance bearing the same relation to the scale as do the pigments in the coloured Pieridæ, and therefore functioning practically as a white pigment.

2. The yellow pigment which is so widely distributed in the Pieridæ (being found in the majority of the genera) is shown to be a derivative of uric acid.

3. The properties of this yellow pigment are described, and the results of its analysis are given. The pigments of various yellow-coloured genera are shown to be identical.

4. It is shown that this yellow pigment may be artificially produced by heating uric acid with water in sealed tubes at high temperatures. The product so obtained was originally described by Hlasiwetz as "mycomelic acid"; but evidence is brought forward to show that the substance described and analysed by this chemist was in reality urate of ammonium coloured by a yellow body, probably identical with the natural pigment.

5. The identity of the natural and artificial products is demonstrated by the fact that both yield under like treatment a purple derivative, which has a well-marked and easily identified absorption spectrum.

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* Abstract of a Paper read before the Royal Society.

6. The artificial yellow product has not yet been obtained in a pure condition, but it may be so far purified as to exhibit clearly all the general properties of the natural pigment.

7. The natural pigment as prepared for analysis is shown to be almost certainly a chemical individual. Its probable constitution is discussed.

8. It is shown that this yellow substance (denominated in the paper "Lepidotic acid"), together with a closely allied red substance, will account for all the chemical pigmentation of the wing scales of the coloured Pieridæ, though modifications may be produced by superadded optical effects. The black pigment found in the group is not dealt with in the paper.

9. The described uric acid derivatives, though universal in the Pieridæ, are apparently confined to this group among the Rhopalocera. This fact enables the interesting observation to be made, that where a Pierid mimics an insect belonging to another family, the pigments in the two cases are chemically quite distinct. This is well seen in the genera *Leptalis* and *Mechanitis* respectively.

10. The existence of pigments other than scale-pigments is for the first time described; substances, namely, which are found between the wing membranes, and which, in certain genera, are the basis of ornament.

11. The fact that the scale-pigments are really the normal excretory products of the animal used in ornament, is emphasised by the observation that the yellow Pierids, on emergence from the chrysalis, are apt to void from the rectum a quantity of uric acid coloured by a yellow substance which exactly resembles the pigment of the wing.

GYMNOPLEURUS; CORRECTION OF NOMENCLATURE.

By John W. Shipp.

Gymnopleurus, Illiger.

Modestus, Lansberge, Notes, Leyden Mus. 8, p. 72, 1886.

Peringueyi, mihi = *modestus*, Pery, Tr. Sth. Afr. Phil. Soc. iv. p. 94, 1888.

Peringueyi, Shipp (*modestus*, Pery *nec* Lansb.). — Nigrocyaneous, opace. Head granulose, a little broader than long, rounded at base, produced angularly laterally, and with an acute ridge on each side; clypeus with the outer margin slightly reflexed, deeply emarginated in the centre, which thus forms two moderately acute teeth; antennæ black. Prothorax convex, once and a half broader than long, with the sides rounded and slightly angulated in the centre, marginated and finely granulose, without any lateral fovea. Elytra finely granulose, strongly developed at the shoulders, deeply striated. Pygidium depressed, carinated at base, and deeply shagreened. Under side very dark blue, shagreened; anterior femora with a median tooth underneath; anterior tibiæ tridentate.

Hab. Beaufort West, Cape Colony. Long. corp. 12–13 mm., lat. 6 mm. Type in Sth. Afr. Mus.

Modestus, Lansb.—"Obscure rubro-cupreus, supra rugulosus, clypeo bidentato, thorace obsolete lineato, elytris obsolete striatis, sinu laterali valde profundo." Long. corp. 8–12 mm.

Hab. Benguela.

I may mention that Peringuey's description was *read* on March 31st, 1886, the same year as Lansberge described his species.

G. modestus is very closely allied to *G. cupreus*, Boh., but is more brilliant, and more distinctly granulated.

Oxford, 1894.

SPILOSOMA LUBRICIPEDA AND ITS VARIETIES IN YORKSHIRE, DURHAM, LINCOLNSHIRE, &c.*

By W. Hewett.

I hope that the following particulars, obtained from many sources and from a careful examination of most of the Yorkshire and Durham collections (not merely once, but often on two or three occasions), will tend to throw a little light on this somewhat dark question, which has already been discussed at some length by Messrs. Porritt, South, and Tugwell (Entom. xxvi. 247, 257, 296, 346; xxvii. 129, 205). The type of *S. lubricipeda* is generally distributed, and, I believe, common in most localities, although, like many other species, it occurs in much greater abundance in some seasons than in others. Mr. Finlay, of Meldon Park, Morpeth, when looking over my collection a short time ago, informed me that the species is rare in all stages in the neighbourhood of Morpeth. The larvæ, when full-fed and about to pupate, are not by any means particular in the choice of their abode—such unlikely places as old kettles, pots and pans of all descriptions, pieces of brown paper, newspaper, old rags, the stalk of a cabbage, or in the pithy branches of the elder; and I have heard of from twelve to sixteen cocoons being taken from one cabbage-stump. The egg, larva, pupa, and the ordinary forms of the imago are too well known to need any description, so I will at once proceed to the chief feature of this paper, *viz.*, a description of the principal varieties which are known to occur.

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* Abstract of a Paper read before the Lancashire and Cheshire Entomological Society, Nov. 12th, 1894.

Var. *radiata*.—In addition to the specimen figured in Westwood and Humphrey's 'British Moths,' plate xviii. figure 19, 1843, which was taken in Yorkshire, and that figured by Newman in the 'Entomologist,' vol. vii. 169 (1874), stated to have been sent to him by Mr. Dawson, of Driffield, there is an example in the Allis collection at the York Museum, which I had the pleasure of examining in company with Mr. S. J. Capper, on October 19th. This specimen, although not so dark as some of the choicest forms of *radiata* lately bred by Messrs. Harrison, Young, Tugwell, and Porritt, is to all intents and purposes identical with them, and exactly corresponded with some two dozen specimens of *radiata* which Mr. S. J. Capper had with him on that occasion. There is neither date, locality, nor name of captor affixed to this or indeed to any of the specimens in the collection, but I think it can be taken for granted that it is a York or Yorkshire specimen. The only other record that I have been able to obtain of *radiata* having occurred in Yorkshire, previous to the introduction of Mr. Harrison's fine form in 1891, is that of three specimens which were taken at rest, not bred, by Mr. Sweeney, at Driffield, some twelve or fifteen years ago. These specimens, which I have seen on three separate occasions, are smaller than those bred by Mr. Harrison, but identical in every other particular with specimens sent to me by Messrs. Porritt and Tugwell, and with which I compared them. They are in fair condition, decidedly aged, and set on household pins. As far as I am aware I do not see any reason for doubting their authenticity, which I think is beyond dispute. Thus we have records of six specimens of *radiata* having been taken or bred in Yorkshire previous to 1891, and I am firmly convinced, that had the works of Darwin and Wallace been more widely read, and the principles of heredity and artificial selection therein explained better understood and acted up to, we should not have had to wait until 1891 to see this truly grand form bred for the first time in England as the result of artificial selection.

Mr. Harrison, of Barnsley, whose fine and extensive series of *radiata* and intermediate forms I have had the pleasure of seeing, and to whom I wrote for particulars of the variation of *S. lubricipeda* in his district, says:—"I do not remember ever breeding *S. lubricipeda* in any form previous to 1891; in fact my series had been picked up casually and were only the ordinary form, neither *radiata*, *eboraci*, nor *fasciata;* and I distinctly say that not any of these three forms occur in this district to my knowledge, neither in a wood nor any weedy garden, as reported [see 'Entomological Transactions' (London), part 4, November meeting, 1892, page xxix, for my original and true history]. My original male was of that form [*fasciata*], and would no doubt be one of the Grimsby pupæ, as I selected the strongest-marked specimen that I had out at the time the female *radiata* came out to pair with. I have kept the original parents."

Mr. Young, of Rotherham, to whom as also to Mr. Harrison, of Barnsley, many of us are indebted for our series of *radiata*, replying to a similar query of mine *re* variation of the species at Rotherham, says:—"I have not bred any variety of *S. lubricipeda* from larvæ collected in this district, in any way approaching to var. *fasciata* or *eboraci;* the form here is very plain, and almost without markings." Mr. J. Bloor, also of Rotherham, confirms Mr. Young's statement. Whilst at Rotherham, on the 27th ult., Mr. J. N. Young showed me some 120 specimens of *radiata* which he had recently bred from "Harrison's strain"; also the photographs of 108 specimens. Mr. Young informed me that *radiata* pair more readily with typical wild specimens of *lubricipeda* than *inter se*, and that the offspring from this union were fertile. Much of the vitality in *radiata* seems to be lost by inbreeding; especially is this the case with the males, which are very sluggish. I have frequently heard it suggested that *radiata* is a distinct species, but the fact of there being no apparent difference in the ova, larvæ, or pupæ, and that when paired with typical wild specimens the offspring are fertile, seems in my opinion to warrant our assuming that it is a fixed variety only. There are some entomologists, I know, who take exception to the larger size of the specimens of *radiata*, and urge this as a reason for its not being of British origin; but size, in my opinion, is chiefly dependent upon the supply of food and selection, as all entomologists who breed large numbers of Lepidoptera are perfectly well aware. I have specimens of *lubricipeda* in my collection, and have seen others, which are to the full as large as any *radiata* that I have yet examined.

With regard to the occurrence of the var. *radiata* in Lincolnshire, several specimens appear to have been bred by Mr. Mossop from larvæ obtained at Saltfleet feeding on elder, August, 1836. These emerged in June, 1837, and some of the specimens are still in the possession of his nephew, Mr. W. H. B. Fletcher, of Worthing; others were sent by Mr. Mossop to Mr. James C. Dale, father of the Rev. C. W. Dale. Mr. Fletcher obligingly furnishes me with the following particulars:—"My knowledge of the occurrence of the varieties of *S. lubricipeda* is practically confined to that which is stated in my letter to Mr. Tugwell, in his article in the 'Entomologist' for April, 1894, except that there is a slight mistake: "Entom. xxvi. 257, var. *deschangi*," should read "Entom. xxv. 257, fig. 1." Now this fig. 1 comes very near to var. *eboraci* as figured Entom. xxvii. 205. My specimen is not exactly like either; it has the central spot and interrogation-like spots on the hind wings, but the fore wings have less of the *fasciata* marking than the *eboraci* figured Entom. xxvii. 205, and much less of the *radiata* markings of Entom. xxvi. 257. If then *eboraci* be a sufficiently defined variety to be worthy of a special name, and not, as I am inclined to think, merely intermediate between type and *radiata* (I know it only from fig. 1), I should refer my specimen to it, and say that *eboraci* occurs on the Lincolnshire coast. Next as to var. *fasciata*, I have none among my uncle's moths so boldly marked as that figured in Entom. xxvii. 205, but I have two specimens of Mr. Mossop's which are clearly tending to become *fasciata;* all the spots forming the 'Y' are present, but shorter, so that I think Lincolnshire may claim to possess var. *fasciata* also. I have never collected *lubricipeda* in Lincolnshire; my knowledge of it there is confined to the possession of seven specimens which came to me with the Rev. J. Mossop's cabinet, containing the remains of his collection and the information which his widow, my aunt, gave me, to the effect that these moths and others were reared by them from larvæ picked up on sandhills at Middlethorpe, which is close to Saltfleet, from where Mr. Mossop sent Mr. Dale three specimens (Entom. xxvii. p. 130)."

Respecting the reported occurrence of *radiata* on the east coast of England, Mr. John Cordeaux, of Great Cotes, Ulceby, Lincolnshire, referring to this form, says:—"Almost exclusively peculiar to Heligoland; met with but very rarely in Holland and on the east coast of England"; whilst Mr. T. D. A. Cockerell (Entom. xxii. p. 148) repeats this statement. Wishing to have this reported occurrence of *radiata* on the east coast of England cleared up, I wrote to Mr. Cordeaux, asking him to be good enough to furnish me with particulars of its occurrence; when, where, and by whom taken; and where the specimens might be at present located; in order that, if possible, I could have inspected them. Mr. Cordeaux, in reply, stated "that the notice published in the 'Naturalist,' 1888, was a verbatim translation from the original paper by Mons. le Baron de Selys Longchamps, Liège, Belgium. The exact words used are (p. 32):—'On la rencontre mais plus rarement en Hollande et sur la côte orientale d'Angleterre.'" Mr. Cordeaux also adds "that he is unable to speak from his own personal observation on the matter," but adds, "Probably the author of the 'Excursion à l'ile d'Heligoland' refers to some English authority for his statement, but he gives no reference to this in the original. . . . The variety is undoubtedly an immigrant to Heligoland, so there is every probability of its occasional occurrence on the east coast." The following is a translation of the Baron's reply to my enquiries for definite information of the occurrence of the var. *radiata* on the east coast of England:—

"Liège, 7th October, 1894.—My dear Sir,—I write you from the country, although I always give my address at Liège, but I shall be in town in eight or ten days, and will then look over my collection and write you a few notes if I find anything that will be useful for you, with regard to the variety *radiata* of '*Arctia*' *lubricipeda*, but I am not sure that I possess any other positive information of my own observation except that which I have given in my 'Excursion to the Isle of Heligoland' in 1882. There I saw, at Mr. Gätke's, the ornithologist, numerous examples which had been reared from eggs. There were amongst them several varieties intermediate between *radiata* and the type. As to Holland, I am convinced that the observation of the country is positive, but I don't remember who was the Dutch entomologist who told me; it could be ascertained. As to the east coast of England, I don't remember where I obtained the information. In Belgium and Holland there have been found for some months melanic examples of *Amphidasys betularia*, but of a black less intense than in Scotland."

Messrs. Porritt and Tugwell have reared two broods (or at any rate a partial second brood) of *radiata* in one season, and this fact is thought by some entomologists evidence sufficient to warrant their refusing to believe in the genuineness of *radiata* as a British form. Personally I do not attach much importance to *radiata* being occasionally double-brooded, as it seems to me to be merely a question of forcing. I am not aware that two broods have been produced in one season under other than artificial conditions. So far as I know, there is no record of *lubricipeda* being double-brooded; and Mr. Jackson, of York, informs me that he has never, in his long experience of the species (extending over thirty years), known it to be so, even in a single instance, under natural conditions.

The Hull collectors, who also breed large numbers of *lubricipeda*, have never been fortunate enough to obtain *radiata*, neither have the collectors at Beverley, Bradford, Barnsley, Darlington, Durham, Hartlepool, Huddersfield, Keighley, Rotherham, Selby, Sheffield, &c.

With regard to the variation of *lubricipeda* in Durham, Mr. T. Maddison, of Durham city, writes:—"I have never got anything like a decent variety, nothing in the least approaching the York or Barnsley varieties"; whilst Mr. J. E. Robson, of Hartlepool, informs me "that although he has never bred *radiata* at Hartlepool, or known it to occur there, he has in his series of *lubricipeda*, bred from larvæ obtained at Hartlepool, several examples of var. *fasciata* and intermediate forms."

Mr. William Newman, of Darlington, has six exceptionally fine varieties of *lubricipeda* (three males and three females) in his collection, all reared from larvæ obtained at Darlington; one of the males being of the var. *fasciata* and two of the var. *eboraci*; whilst two of the females have the hind wings similar to the var. *radiata* and the fore wings almost typical. He has also bred other similar varieties from time to time.

I quite agree with Mr. Tugwell in thinking that the explanation of the occurrence of var. *radiata* in Lincolnshire and Yorkshire is to be attributed to the "brought over" theory, and that the original specimens or parents have come over to this country from Heligoland, either by their own unaided flight, or else as stowaways on board ship. The chances of their distribution inland would be materially increased by means of the railway. I have frequently known southern insects to be found in waggons arriving in York from the south.

(To be continued.)

ON *ZYGÆNA EXULANS* AND VAR. *SUBOCHRACEA*, WHITE.

BY W. H. TUGWELL.

In the 'Entomologist's Record' for November, 1894, is a long and interesting article by Mr. Tutt on *Zygæna exulans*, and certain very beautiful forms of this species that Dr. Chapman and himself had met with when on a tour over that entomological "El Dorado," the French, Swiss, and Italian Alps, during the last week of July and part of August. Mr. Tutt exhibited some of these very fine forms, and read notes on them, at the Entomological Society, and also at the South London Entomological and Natural History Society. One of the objects of the exhibition and remarks thereon appeared to be the upsetting of var. *subochracea*, Mr. Tutt considering that the "Braemar form, which Dr. White named var. *subochracea* (on his first discovering the insect in July, 1871, and cited in Entom. vi. 22), was only so named in consequence of their worn condition," and stated that the few specimens I had given him in 1886 "corresponded excellently with Dr. White's definition of what a Scotch *Z. exulans* (a somewhat diaphanous form) should be. They evidently belonged to the variety which Dr. White created specially for these rather rubbed specimens." But surely Mr. Tutt knows well enough that out of the long series Mr. L. Gibb and myself secured on our trip in 1886 many of them (50 per cent.) were in the finest order. That Mr. Tutt only had but moderately good ones was due doubtless to the fact that he *never gave me a specimen of any kind*, and we are naturally inclined to help those best who assist us. Still, one thing is evident: poor as they were, it has taken him six years to improve on them. But for Mr. Tutt to remark that it is only this year that we have learned how "really fine Scotch *exulans* ought to look," is simply ridiculous, as from 1886 to present time I have distributed to my friends over 1000 specimens, a large percentage being in the finest condition, and fully equal to any seen this year.

The curious part of Mr. Tutt's exhibit was that prior to showing them he had taken the extraordinary course of repinning and resetting some of his Scotch specimens, and then mixing them up with his continental examples in such a manner that no one but himself could have the remotest chance of using his own judgment as to their approaching each other, as Mr. Tutt simply refused to say which were continental and which were Scotch. He merely stated that "they were alike." Now one thing is self-evident: they either do or do not overlap each other in form. And may I be allowed to suggest to Mr. Tutt that it would have been much more satisfactory and conclusive if he had permitted others than himself to have seen the continental specimens arranged side by side with the Scotch; and then, as may be quite possible, others could have been convinced of the fact, and have seen for themselves that Dr. White's varietal name was superfluous. As it stands, no one can gainsay Mr. Tutt's statement, as they have no possible means of judging for themselves. Mr. Tutt very kindly brought his specimens to me, but, as he still followed the lines of his previous exhibit in London, I could only admire some of the most striking varieties. It was abundantly clear that many of them were so different that they looked as if they might belong to another species. Some of the specimens may have approached each other very closely, but his curious mystery of mixing and blankly refusing to point out the Scotch and continental individuals made it impossible for me to follow his statement. *This may be "science,"* but evidently I have not been educated up to this manner of it.

The box of specimens Mr. Tutt showed me contained possibly some forty or fifty specimens, and, referring to one row of a grand form, totally unlike any Scotch I had ever seen, I ventured to say that not one in that row was Scotch. Mr. Tutt said, "Yes, there is." "Which one?" I asked. He would not say. I then remarked that I knew every one that had ever been on the ground since 1872, and I should be glad if he would say who had parted with such a grand variety. Mr. Tutt warmly refused to say; and so the statement stands. As I could not get any very definite information from Mr. Tutt, I wrote to Dr. Chapman, telling him I was much interested in the Zygænidæ, and that Mr. Tutt had shown me some of their joint captures, but that he absolutely refused to indicate which were the continental specimens he stated to be like the Scotch. I asked Dr. Chapman to kindly judge, if I forwarded him a box of Braemar insects, if they were like some of his continental specimens, and telling him of the different views Tutt and I held; or would he kindly loan his continental forms to me? To this Dr. Chapman most kindly replied that he was "sorry to be unable to help me in *exulans*, as, although he had taken most of the specimens, he had passed them all over to Mr. Tutt. . . . . We met with *exulans* in several places; but in two excursions, when not accompanied by Mr. Tutt, I met with it abundantly at Lauteret, where it was magnificent, in size, colouring, and density of scaling, so that I did not take it to be *exulans;* here the vegetation was very luxuriant, the season having been propitious. On Valgrauson (Cogne) it was in thousands, but drought had prevailed, much vegetation was burnt up, and *exulans* had hardly any like the Lauteret specimens, and varied down to minute dwarfs, and others very colourless and transparent; the result, I took it, of starvation. The variation in the Grauson specimens was so great that I imagine *some* would be found like the Scotch, whilst I should be surprised if the typical specimens from each locality did not present considerable differences." Again Dr. Chapman writes:—"I agree substantially with your views as to varieties of *exulans.* I should be surprised if Braemar *exulans* did not differ from continental forms." These remarks of Dr. Chapman's are, to my mind, very conclusive as to the variation of our Scotch form from those he took, and should carry great weight.

From letters quoted above it is clear that, owing to the drought burning up the food at Valgrauson, many larvæ had starved, and consequently produced varieties, some of these coming near Scotch specimens; but Dr. Chapman says that the type there differs considerably; whilst the Scotch *subochracea* is not the result of accidental variety, but a constant form. Any way, each year from 1886 I have had specimens from Braemar, only missing one year, and they have always been of the same form. Only the smallest possible variation has been noticed; some few are almost colourless, and in others there is slight variation in size of spots or in colour, from bronzy blue to bronzy green, common to most of the Zygænidæ. To my mind the Scotch *exulans* is a very weak race, hence the want of pigmental colour; and I am certain that I should be enabled to pick out 98 per cent., if mixed with other forms, by characters that, so far as I have been able to judge, are constant and readily recognisable by any one well acquainted with the form.

Mr. Tutt mentions the specimens as shown by Mr. Percy Bright, so I wrote him for his opinion on them, as compared with Mr. Tutt's. He writes me:—"With regard to *exulans,* on comparing them with those that Mr. Tutt exhibited, I was struck with the fact that the continental specimens were much more strongly marked and denser in scales, giving them a handsomer appearance, than even the freshest of the Braemar specimens."

As to the question of synonymy, I am little disposed to enter; but, so far as I can see, the question is in a muddle. Neither Sigismond von Hochenwarth nor J. W. Dalman appears to be free from blunders; neither appears to have recognised the great difference between the sexes, making two species; both up to a certain extent make the female *Z. exulans.*

The short Latin description given by Hochenwarth is practically useless. He says:—"*Sphinx exulans.* Alis superioribus hyalino-virescentibus, albido nervosis, maculis quinque rubris utrinque conspicuis; inferioribus præter marginem apicis hyalino-virescentem, rubris immaculatis." This only serves for the female of our form, as the males never have white scales, or, as Hochenwarth afterwards, in his extended characters of his *exulans*, says, "feet whitish or yellowish." Our males have always black feet. And then Hochenwarth gives size as "equal to '*S. statices*' or '*S. filipendulæ*'"; certainly our Braemar insect never reaches the size of *filipendulæ*, but the continental does, and some of Mr. Tutt's specimens were even considerably larger than that. The largest *subochracea* I have ever seen, and only one, is $1\frac{7}{16}$ in., and the smallest is 1 in. only; an average male is $1\frac{1}{4}$ in.

Dalman's description is almost better, so far as our Scotch insect is concerned. Dalman says of *Z. exulans*:—"Alis anticis fusco-virescentibus subdiaphanis, subtus concoloribus, maculis quinque rubris inæqualibus (venis albidis), posticis rubris margine fusco-virescenti; antennis vix clavatis; pedibus luteis." This, too, only describes the female; but Mr. Tutt opines that our Scotch form is Dalman's *Z. vanadis*, which up to a certain point does agree with the Braemar male insect. Dalman's description of *vanadis* is, "Alis anticis fusco-virescentibus subdiaphanis maculis quinque rubris, basali exteriori elongata, posticis rubris margine fusco diaphano latiore; corpore pedibusque nigris pilosis; antennis brevibus clava crassa. Habitat in Lapponia." This is fairly well, but how does Dalman's further description agree? He says, "Maculæ quinque rubræ, *colore et ordine ut in* Z. loniceræ." Who ever saw a Scotch *exulans* of the colour of *loniceræ?* I never did, and I may safely say I have seen more Braemar *exulans* than any other lepidopterist. It is just this great colour difference that renders Dr. White's name of *subochracea* not only characteristic, but necessary; and I believe that the Scotch form of *Z. exulans* will continue to be known by this name, notwithstanding Mr. Tutt's attempt to sink it in favour of *vanadis*. Dalman's *vanadis* is simply the male form, and in no way includes the female character; whilst Dr. White's *subochracea* covers both sexes (*vide* Entom. vi. 22–25).

Greenwich.

N.B.—The Latin descriptions of Hochenwarth and Dalman are copied from the 'Record,' as I have not the originals to refer to.—W. H. T.

CHARÆAS GRAMINIS IN DEVON.

By Major John N. Still, F.E.S.

Judging from the remarks made by Newman (Brit. Moths, 293), who quotes Linnæus on the damage done by the larvæ of this insect in Sweden, the account by the same author of the mischief done near Keswick, and the mention of another outbreak in Sweden as late as 1892, by Dr. Sharp (Entom. xxvii. 317), as well as the interesting article on the "hill grubs" of Southern Scotland by Mr. Service (*l. c.*, 278), we may consider *C. graminis* one of the more destructive of the Noctuæ.

Fortunately for the pastures of Devon, the insect is not as a rule abundant there. Until August, 1893, I had never met with it alive, and it was with considerable pleasure that I secured a series resting on thistle-heads.

The insect is supposed to fly only early in the morning and again in the evening, and Newman gives an interesting account of this habit, which I should never have dreamt of questioning but for my experience this year.

On August 30th, while walking over that portion of Dartmoor between Classenwell Pool and Princestown, a distance of four or five miles, *C. graminis* appeared in, I may safely say, thousands. They were continually on the wing, flying low over the grass and heather, and hardly a yard could be walked without putting one up; and they continued on the wing in the same numbers, flying in the hottest sunshine, from 11.30 till I left the moor about 4 o'clock. The next day, and a very hot one it was, the insects were again on the wing the whole distance between Princestown and Siwards Cross, and during a long détour back again, a round of nearly ten miles.

If the moths were flying in the same large numbers all over the moor as they were over that part I traversed—and I do not see why they should not have been, as there is not the slightest difference in the herbage—it would be almost impossible to exaggerate the prodigious quantities of this insect.

I can fully endorse the statements of Mr. Dalglish (Entom. xxvii. 317) as to the number of females; from my own experience they outnumbered the males by twenty to one. And also as to the enormous quantity of ova laid by the moths; from those captured I procured literally thousands of eggs.

The largeness of the proportion of females is interesting; they were evidently taking advantage of the great heat to deposit their ova. I am inclined to think that no males were on the wing, except those that our movements disturbed from their hiding-places amongst the heather.

In the case of *Neuronia popularis* and *Luperina cespitis*, the exception is to take a female by means of light; nearly all are males; perhaps the male *C. graminis* flies at the same time.

I shall be glad to hear the opinion of others.

Scottish Conservative Club, Edinburgh, Nov. 28th, 1894.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from vol. xxvii. p. 264.)

Cerigo matura, *Hufn.*—Widely spread, but rarely abundant. Some bright Irish specimens have very pale nervures on the outer marginal area like those of *Neuronia popularis*, and enclosing a series of wedge-shaped dark streaks along the hind margin. Very dark specimens, approaching the var. *texta*, Esp., sometimes occur, as at Magilligan, Co. Derry, Castletownsend, Co. Cork, and Markree, Co. Sligo, in which the fore wings are of a dark bistre brown, traversed by three pale waved lines, of which the basal and ante-marginal ones are sometimes almost obsolete, and the stigmata somewhat ferruginous, with pale outline. Hind wings broadly and darkly banded on outer margin. Localities: single specimens taken at Giant's Causeway (*C.*) and Armagh (*J.*); at Drumreaske, Monaghan, Castle Bellingham, Co. Louth (*Thornhill*), and near Sligo, it is not infrequent. I met with it in profusion at Castle Taylor, Co. Galway; and singly at Kenmare and Dursey I., Co. Kerry; and Howth.

Luperina testacea, *Hb.* — Usually common, especially on the coast. None of the various forms seem topomorphic, nor can I find any proof of local tendency to melanism. Both at Sligo on the west, and Howth on the east coast, very pale forms (var. *cinerea*, Tutt) occur, as well as specimens almost black. The latter Mr. Barrett also records from Belfast.

Luperina cespitis, *Fb.*—Of sparse occurrence, rarer inland than on the coast-line. Dublin coast (*B.*), Howth; Kilcool, Co. Wicklow; Athy, Co. Carlow; Minehead and Roche's Point, Co. Cork; Ardrahan (*Miss N.*), and Moycullen (*Miss R.*), Co. Galway; Hollybrook, L. Arrow, Co. Sligo.

[Mamestra abjecta, *Hb.*—Mr. Birchall's record of the capture of this species at Howth, and abundantly near Waterford, has never been confirmed.]

Mamestra sordida, *Bork.*—On the Dublin coast (*C. G. B.*).

Mamestra albicolon, *Hb.*—Mr. Birchall took this insect at Malahide and Howth, Co. Dublin; but repeated searches at these places of late years have proved unproductive. One at Magilligan, Co. Derry (*C.*); Castle Bellingham, not scarce.

Mamestra furva, *Hb.*—Not anywhere numerous. Howth and Wicklow coast (*B.*).; rare near Sligo, and the specimens very large (*R.*); Castle Bellingham, Co. Louth (*Thornhill*); Carlingford (*J.*), Armagh; and Coolmore, Co. Donegal; a few near Derry (*C.*). Irish specimens for the most part seem very dark.

Mamestra brassicæ, *L.*—Extremely common. The insect varies in the intensity of the ground colour, occasionally being of a deep blackish brown; and at Howth and elsewhere on the sea-coast I have met with specimens of a smooth brown colour, with the pattern very well defined, with paler marbling. The var. *albidilinea,* Haw., occurs.

Mamestra persicariæ, *L.*—Rare in Ireland, and almost absent from the Northern counties. So far as my knowledge extends it does not vary appreciably, the subterminal row of dots being always present in the Irish specimens I have seen or taken. The most northern occurrence that I know of is a specimen taken by Mr. C. Langham, at Tempo Manor, near Enniskillen. Another is reported by Mr. G. Foster from Co. Down (Irish Nat., Jan. 1893); Sligo one (*M'C.*). It is not rare at Clonbrock, where Mr. Dillon found the larvæ on elder, or Castle Taylor (*Miss N.*), Moycullen (*Miss R.*), Co. Galway; Crossmolina, Co. Mayo; Kenmare and Killarney, Co. Kerry; near Cork (Sandford, Ent. xviii. 321) and Glandore (*D.*), Co. Cork; Portlaw, Co. Waterford (*Rev. W. F. Flemyng*); near Dublin (*Mr. Shield*).

Apamea basilinea, *Fb.*—Everywhere abundant. The most usual form, at least in the central part of Ireland, is of a pale brownish grey, unrelieved by any ferruginous tint or defined markings, except the pale stigmata and the basal streak; agreeing generally with Mr. Tutt's description of his var. *cinerascens.* Near Mullingar and elsewhere (Kenmare, Co. Kerry; Favour Royal, Co. Tyrone, &c.) occurs a much better delineated form, sometimes with ferruginous clouding on the central area of the fore wing, the orbicular and reniform stigmata clearly marked, especially the latter, which has its lower portion darkly suffused. A modification of this strongly marked form rarely occurs, having a dark shading from costa to inner margin, passing between the two stigmata. This appears to be var. *finitima,* Gn.

Apamea gemina, *Hb.*—Very common everywhere. Occasionally very dark specimens occur with the type, of a mottled greyish black. I have taken Mr. Tutt's var. *intermedia-rufa* in Tyrone, and the *intermedia-grisea* frequently in various localities. The var. *remissa,* Hüb., is not by any means uncommon at Howth, and near Kenmare, where splendid examples of it are to be met with. Also, but sparingly, at Drumreaske, Co. Monaghan; and Favour Royal, Co. Tyrone; Lambay I. near Dublin, and elsewhere.

Apamea unanimis, *Tr.*—Very rare in Ireland. Mr. Barrett took it near the Phœnix Park, Dublin; Killynon, Westmeath

(*Miss R.*); a series of eight, Castle Bellingham, Co. Louth (*Thornhill*).

APAMEA OPHIOGRAMMA, *Esp.*—Local, but widely distributed, I think, in Ireland. Drumcondra, on the canal banks, not infrequent (*S.*); Cromlyn, two (*Mrs. B.*); Killynon, one, Co. Westmeath; Johnstown, Co. Kilkenny (*S.*); Markree Castle, Co. Sligo; Clonbrock, Co. Galway; not rare at Castle Bellingham (*Mr. W. B. Thornhill and myself*), Co. Louth; Belfast marshes, one (*W.*).

APAMEA LEUCOSTIGMA, *Hb.*—Widely distributed and locally abundant in Ireland. The type is often of a very dark sooty black, occasionally with the stigmata almost wholly obliterated, sometimes the reniform ochreous, but generally white. The ground colour varies gradually to a bright ruddy brown, and the markings and bands similarly increase in distinctness until we reach the brightest form of the var. *fibrosa*, Hüb. I have taken both extremes constantly at the same localities, and can find no indication of any topomorphism in this species. Belfast (*B. and W*)., Derry (*C.*), Markree Castle and elsewhere, near Sligo, abundant; Killynon (*Miss R.*), Coolmore (*J.*), Stranorlar, Ards, and near Donegal; Favour Royal, Tyrone; Armagh (*J.*); Drumreaske, Co. Monaghan; Farnham, Co. Cavan; Clonbrock, abundant, and Galway (*A.*); Castle Bellingham (*Thornhill*), Co. Louth; Ballycotton (*S.*), Co. Cork; Killarney, abundant (*B.*), &c.

APAMEA DIDYMA, *Esp.* — Very common in most localities. The following aberrations are among those I have taken.

A dirty-grey unicolorous form, Howth, Co. Dublin; and Toberdaly, King's Co.

The same, with a whitish stigma; ab. *grisea-alba*, Tutt.

One similar, with the addition of an ⊢⊣ mark, taken at Clogher Head, Co. Louth.

Ab. *secalina*, Hb.—Same locality, and elsewhere, rare.

Ab. *I-niger*, Haw.—Pretty common.

Ab. *rava*, Haw.—Not common. On the south coast, and at Clogher Head, Co. Louth; Loughrea, Co. Galway.

Ab. *furca*, Haw.—Common in most localities.

Ab. *lugens*, Haw.—Rare.

Ab. *leucostigma*, Esp.—A common form.

Unicolorous forms are numerous, ranging from dingy grey, reddish, dark brown, to black ab. *lugens*.

(To be continued.)

NOTES AND OBSERVATIONS.

Monochammus sutor, L., in Yorkshire.—A male specimen of this beetle, which had been caught in the workshop of one of the timber-merchants of Leeds, was given to me on Aug. 14th this year. It was kept alive for over a month by feeding it on small cubes of cabbage, cut from the midrib of the leaf, which enabled me to measure approximately its rate of feeding. I kept it under a large bell-glass, up the sides of which it could travel with ease, falling only when it got too far on the rounded dome of its prison. By some accident the right anterior tarsus was injured, and the power of climbing glass was denied it, and one witnessed, when it was not asleep or feeding, a constant but unsuccessful attempt on its part to climb the bell-glass by substituting the middle foot for the injured fore foot. It fed well, especially towards midnight, and died apparently because, as a male, its period of life as a perfect insect was short. When feeding, the long antennæ were always curved, and the tips—nearly four inches apart—were in constant motion, though the cube of cabbage on which it fed was more than an inch away from them. When walking on my hand it sometimes paused to bite it. Its feet were well adapted for climbing, being furnished with concave pads of curved hairs, those on the anterior pair of tarsi being one-third larger than those on the middle and posterior pairs. The weight of the insect, the shifting of its equilibrium, and the inability to apply the pads of the right mid foot effectively, were probably the causes why the *Monochammus* could not ascend a glassy surface after it was injured. On examining the tarsi, without attempting to dissect them, as the insect was sufficiently valuable to preserve entire, I made out several points of interest. The claws on the last joint (onychium) were long, sharply pointed, strongly curved, and almost at right angles to the joint; the third joint was deeply bilobed, its distal portions somewhat enwrapped and supported the onychium. The first, second, and third joints were provided with pads of curved hairs; all the joints had on their dorsal aspects strong straight hairs, and on their margins long simple hairs, which curved downwards and curled in towards the pads so conspicuously as to give the tarsi a feathery appearance. The hairs which formed the pads were curved backwards, their tips being flattened and terminated by acuminate ovate areas. On these areas, and projecting from the *outer* or *dorsal* aspect of each hair, were patches of six to eleven short conical spines, inserted at right angles to the hair which carried them. Supposing each pad to have been made up of 1000 curved hairs,—and probably there were many more,—and that each of these carried an average of eight conical spines, there must have been over 140,000 spines on the feet of the beetle I was examining. Small need to wonder at the ease with which it went up a wall of glass. As only about half-a-dozen records of the occurrence of this beetle are known in Britain, and, so far as I can learn, none for Yorkshire, this record and note may be of some interest to coleopterists.—Henry Crowther, F.R.M.S.; The Museum, Leeds, Nov. 19th, 1894.

Note on Bombyx trifolii.—As the food-plants of this species are being discussed, I may mention that I have found the larvæ thrive admirably on *Plantago major*. With regard to Mr. Turner's note (Entom. xxvii. 316) concerning the disastrous effect of removing the pupæ from their cocoons, it is noteworthy that in some conditions it seems equally fatal to their emergence to leave them alone. A few years ago I reared some larvæ of this species till they spun up, but many weeks elapsed, no moths having emerged, It was found, on examination, that in every case the insects had matured, and had left the pupal case as far as they were able, but had been unable to push their way through the partially-ruptured cocoon. In some instances the palpi and head of the dead and dried prisoner could be seen protruded. From the condition of the cocoons it appeared that there had been a lack of sufficient solvent fluid to enable enough of the front part to be softened to admit the passage of the moth. I have never found this inability to escape from their cocoons with *Bombyx quercus*, although it is a very laborious process with this species, as may be observed if it is witnessed from the commencement. After the front end of the cocoon has been sufficiently softened, the moth begins a series of strenuous efforts to escape, which are never wholly successful at once, prolonged rests being taken by the insect between its endeavours to force an exit.—R. M. Prideaux; Carisbrooke, Isle of Wight, Nov. 19th.

Caradrina superstes not a British Insect.—It now appears that *Caradrina superstes* has not yet been taken either in Guernsey or England; the specimens I have taken in the past few years, and of which I, in conjunction with Messrs. Abbott and Tait, took over two dozen this past autumn at Freshwater, turn out to be *C. ambigua*. Mr. L. B. Prout discovered the blunder, and pointed it out to Mr. Tutt as far back, if my memory serves, as October, at a meeting of the City of London Entom. and Nat. Hist. Society. Mr. Tutt then acknowledged his mistake, but has not seen fit to correct it yet, beyond a sudden alteration of the name, without explanation, in the subsequent numbers of the Ent. Rec. I have taken the liberty of drawing your attention to the fact, in view of your article (Entom. xxvii. 342) on "Additions to the List of British Lepidoptera during the past ten years."—Albert Hodges; 2, Highbury Place, N., Dec. 20th, 1894.

On the Lanceolate Form of Epinephele hyperanthes.—In July, 1893, I captured, at Oxford, a remarkable variety of *E. hyperanthes*, Linn. (*tus*, Stgr. Cat.), which is identical with Mr. South's figure (Entom. xxvi. 281). I propose to name this form *lanceolata*. The other extreme form, in which the ocelli or spots on the wings are almost obsolete, is called *arete*,* Müller, by continental entomologists.

Var. *lanceolata*.—Colour similar to the type. Upper surface: fore wings with two largish roundish ocellated spots, with a creamy-white centre spot; the blackish ring is rather thick, and is margined with a rather wide creamy-white margin; hind wings with four similar ocellated lanceolate spots, each having a whitish centre; the spots are much narrower on the outer side nearer the margin of the wings, and are in one or two instances produced to a point; the spot at the apical angle of the hind wings is considerably smaller than the others.

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* *Arete*, Müller, Fn. Fr. p. 36; Ochs. Die Schm. Eur. i. 1807, p. 228.

Under side: fore wings with two large semi-lanceolate ocellated spots, the one nearest to the costa being much larger than the other; hind wings with five lanceolate ocellated spots, the two spots near the upper margin being confluent, with whitish centres and a large creamy margin; the other three spots are almost of equal size, the centre one being slightly larger than the others.

Accounts of this form, to recapitulate which is unnecessary, will be found in the 'Entomologist,' vols. xxv. p. 215; xxvi. p. 281; and in Mr. Barrett's Brit. Lep. vol. i. p. 253.—JOHN W. SHIPP; Oxford, 1894.

CAPTURES AND FIELD REPORTS.

AMPHIDASYS BETULARIA var. DOUBLEDAYARIA IN IRELAND.—It may interest some of your readers to know that from pupæ dug by myself in this locality last winter, *A. betularia* var. *doubledayaria* emerged on June 26th. This is, I believe, the first recorded capture in Ireland. As I possessed no pupæ obtained from any other source at that time, there is no possibility of any mistake.—W. B. THORNHILL; Castle Cosey, Castle Bellingham, Ireland, Dec. 9th, 1894.

PLUSIA MONETA IN BERKS.—During the last week of June, 1894, I captured two specimens of *Plusia moneta* in the garden here, flying at larkspur (*Delphinium*) on successive evenings. I see there is another specimen, I believe recently captured, in the Holland Collection at Reading Museum. I want a record of this moth for Dorsetshire.—M. J. MANSFIELD; Hurstcroft, Ascot.

RARE LEPIDOPTERA AT FRESHWATER.—I am able to record the capture of five specimens of *Caradrina ambigua* and one specimen of *Leucania albipuncta*, at sugar, between Sept. 15th and 21st, at Freshwater, Isle of Wight, all in fine condition.—P. W. ABBOTT; Four Oaks, near Birmingham.

LEPIDOPTERA AT LIGHT AT IPSWICH.—Although the year 1894 has been generally adverse to day-collecting and net-work, I have not found a consequent decrease in the number of Heterocera, having devoted more time to the two electric arc-lamps in this town and the ordinary gas-lamps, although the early morning visits to these sources in April and May were not nearly so productive of insects as 1893, the only captures worth recording being *Tæniocampa populeti* and *Dicranura bifida* on April 9th; but this I attributed to the weather. As an instance of the diminished numbers, last year, when the gas-lamps would be dotted with "brimstones," their colour showing off to advantage in the rays of the rising sun, and perhaps by the proximity of an example of *Euchelia jacobææ*, I have not seen more than a half-dozen of the former this year, while of the latter not one has turned up. All loss in this way, however, was made up by spending an occasional evening at the electric lamps till the early hours of the morning, the lost repose being amply repaid by the happy time spent in continually wielding the net at occasional representatives from the "hawk-moths" or other larger species. In point of abundance, the first place must be assigned to *Melanippe fluctuata* and *Noctua c-nigrum*, both of which were a perfect nuisance; the former was on the wing right away from April to September, while on some occasions fifty of the latter might easily have been taken at rest in the vicinity of the arc-lamps during the day, and the last specimen seen was on October 31st. *Amphidasys betularia*, *Arctia menthastri*, *A. lubricipeda*, *Hadena chenopodii*, *Xylophasia polyodon*, *Mamestra brassicæ*, *M. persicariæ*, *Agrotis exclamationis*, *Phlogophora meticulosa*, *Luperina testacea*, and *Plusia gamma* were also numerous in their season. Some remarkable melanic specimens of *A. betularia* occurred, a few having wings perfectly black, except for a slight resemblance to the usual colour on the hind wings just where the hind margin of the fore wing overlaps. Those showing this aberration were usually much smaller than the normal insect. Following is a list of captures for each month, commencing with March; where not otherwise stated, they were taken at electric light. March, on lamps: *Aniosopteryx æscularia*, *Hybernia progemmaria*, *T. munda*, *T. gothica*. April: *Amphidasys prodromaria*, *Biston hirtaria*, *T. instabilis*, *T. stabilis*, *A. æscularia* (23rd); lamps—*T. populeti*, *Selenia illunaria*, *Lobophora lobulata*, *Cidaria miata*. May: *Notodonta chaonia*; lamps—*Eupithecia vulgata*, *E. absinthiata*. June: *Hemerophila abruptaria*, *Grammesia trilinea*, *Smerinthus ocellatus*, *S. populi*, *Sphinx ligustri*, *Pygæra bucephala*, *Hadena pisi*, *Dicranura bifida*, *Ptilodontis palpina*, *Eurymene dolobraria*, *Plusia chrysitis*, *Caradrina alsines*, *Axylia putris*, *Miana strigilis*, *Acronycta tridens* (?), *A. psi*, *Agrotis segetum*, *Euplexia lucipara*, *Boarmia rhomboidaria*, *Eupithecia rectangulata*; lamps—*Metrocampa margaritaria*. In July I was away on my holiday, and only took *Chelonia caia*, *Plusia iota*, *Bombyx neustria*, *Amphidasys betularia* (27th), and *Acidalia imitaria*. August: *Leucania lithargyria*, *Agrotis puta*, *A. tritici*, *Noctua rubi*, *Notodonta camelina*, *Triphæna orbona*, *T. ianthina*. September: *Noctua plecta*, *Heliophobus popularis*, *Ennomos tiliaria*, *E. fuscantaria*, *A. exclamationis* (18th), *Hydræcia micacea*; lamps—*Catocala nupta*, *Eubolia cervinaria*. October: *Melanippe birivata*, *Agrotis suffusa*, *Anchocelis pistacina*, *A. litura*, *Xanthia ferruginea*, *Nonagria lutosa*; lamps—*E. cervinaria* (3), *Chesias spartiata* (3), *Polia flavicincta*, *Oporabia dilutata*, *Hybernia defoliaria*. On the 8th, early morning, I took *Nonagria typhæ* (2), *Gortyna flavago* (1), *Xanthia gilvago* (1), *Eugonia tiliaria* (3), *E. angularia* (1), *Cidaria testata* (1), *C. miata* (2), *Mamestra brassicæ*, and *Rumia cratægata*, which speaks for the mildness of the weather at this time, and this has been still further exemplified by the following captures in November:—*Diloba cæruleocephala*, *Chesias spartiata* and *P. gamma*, on the 5th; other captures up to the time of writing being *Himera pennaria*, *Cheimatobia brumata*, *H. defoliaria*, and *H. aurantiaria*.—Claude A. Pyett; 28, Waterloo Road, Ipswich.

Liparis salicis in the London District. — With reference to Mr. Bird's communication (Entom. xxvii. 347) concerning *Liparis salicis*, I may say that I found the moth on a fence here in August last year. Bromley is ten miles distant from London Bridge. — E. H. Tait; 4, Holwood Road, Bromley, Kent, Dec. 15th, 1894.

In 1886 I found larvæ of this species common at West Dulwich, and bred the perfect insect therefrom. This year (1894) I saw several larvæ on the same trees.—Walter A. Pearce; 88, Croxted Road, West Dulwich, S.E.

Aporia cratægi in Monmouthshire, 1893.—I have much pleasure in stating that this fine species still exists—or at least existed last year—in Monmouthshire. It has just come to my knowledge that on May 22nd, 1893, Messrs. H. S and C. N. Johns, of this town, while collecting on the moors a few miles from here, came upon three webs, two of which were of considerable size, upon whitethorn bushes, and an examination resulted in the discovery of several larvæ of *Aporia cratægi*, nearly full grown, but still feeding. Some of these were taken, but unfortunately all died, not one of them pupating. A short distance further on, four newly-emerged imagines of the same species were captured while flying in some clover fields; and one of the specimens is now in my possession, having been kindly presented to me by Messrs. Johns, who still have the three others. The date is undoubtedly early for imagines of *cratægi*, but that is easily accounted for by the very exceptional weather of 1893. The captors were well aware that this insect was formerly abundant in the county, but did not know that it had become scarce of late years; consequently their discovery was treated as a matter of course, and they have not since been to the place. As the insect is such an old inhabitant of Monmouthshire, I have no doubt that it could have been taken during the last season by anyone who had chanced to visit the spot; and I hope to be able to give a further account of it next year.—W. Edney Cox; 25, Caerau Road, Newport, Mon., Dec. 10th, 1894.

Captures at Sugar during 1894.—Having read the reports of collectors from various parts of the country, I noticed with surprise the desponding way in which the majority spoke of their evenings with the sugaring tin. I append a list of insects which I either saw or took on sugar during this season, and although it may contain no "rarities," yet proves that sugaring was not altogether unproductive in this district:—*Boarmia repandata*, *B. rhomboidaria*, *Iodis lactearia*, *Acidalia remutata*, *Timandra amataria*, *Cabera pusaria*, *Hybernia progemmaria*, *Larentia didymata*, *Melanippe sociata*, *M. fluctuata*, *Phibalapteryx lignata*, *Cidaria testata*, *Thyatira batis*, *Cymatophora or*, *Asphalia diluta*, *Acronycta psi*, *A. rumicis*, *Leucania lithargyria*, *T. pallens*, *Hydræcia nictitans*, *H. micacea*, *Xylophasia rurea*, *X. lithoxylea*, *X. sublustris*, *X. monoglypha*, *Dipterygia scabriuscula*, *Neuria reticulata*, *Mamestra brassicæ*, *Apamea basilinea*, *A. gemina*, *A. unanimis*, *A. leucostigma*, *A. oculea*, *Miana strigilis*, *Grammesia trigrammica*, *Caradrina morpheus*, *C. alsines*, *Russina tenebrosa*, *Agrotis puta*, *A. suffusa*, *A. segetum*, *A. exclamationis*, *A. nigricans*, *A. tritici*, *A. aquilina*, *Noctua glareosa*, *N. augur*, *N. c-nigrum*, *N. triangulum*, *N. brunnea*, *N. festiva*, *N. dahlii*, *N. rubi*, *N. umbrosa*, *N. baia*, *N. xanthographa*, *Triphæna comes*, *T. pronuba*, *Amphipyra pyramidea*, *A. tragopogonis*, *Mania maura*, *M. typica*, *Tæniocampa gothica*, *T. incerta*, *T. stabilis*, *T. pulverulenta*, *Orthosia lota*, *Anchocelis rufina*, *A. pistacina*, *A. lunosa*, *A. litura*, *Cerastis vaccinii*, *C. spadicea*, *Scopelosoma satellitia*, *Xanthia fulvago*, *X. flavago*, *X. circellaris*, *Calymnia trapezina*, *Polia flavicincta*, *Cleoceris viminalis*, *Miselia oxyacanthæ*, *Agriopis aprilina*, *Euplexia lucipara*, *Phlogophora meticulosa*, *Aplecta nebulosa*, *A. advena*, *Hadena protea*, *H. dentina*, *H. adusta*, *H. pisi*, *H. thalassina*, *H.* (*trifolii*) *chenopodii*, *Gonoptera libatrix*, *Plusia gamma*, *Catocala nupta*. Some Coleoptera which turned up included *Carabus catenulatus* (15), *C. violaceus*, *C. granulatus* (8), *Hypulus proteus*, *Dorcus parallelopepidus* (2), and *Endomycus coccineus*.—Ernest Baylis; Burrell Road, Ipswich.

Collecting in Argyleshire from June 10th, 1894.—The following is a complete list of species taken or observed here, omitting the month of August, when I was away. Sugaring was very successful during the latter part of June and beginning of July. Even on very windy nights moths swarmed on the trees. Since that time it has been absolutely useless. Rhopalocera :—*Pieris brassicæ, P. rapæ, P. napi, Argynnis euphrosyne, A. selene, A. aglaia, Hipparchia ianira, H. semele, H. hyperanthus, Cænonympha pamphilus, Vanessa urticæ, Lycæna alexis, Polyommatus phlæas.* Heterocera :—*Smerinthus populi, Hepialus velleda, H. humuli, Lithosia quadra, Euchelia jacobææ, Euthemonia russula, Chelonia plantaginis, Arctia caia, A. fuliginosa, A. menthastri, Orgyia antiqua, Bombyx rubi, Rumia cratægata, Metrocampa margaritaria, Odontopera bidentata, Himera pennaria, Cleora lichenaria, Cabera pusaria, Lomaspilis marginata* (abundant), *Larentia pectinitaria, Emmelesia affinitata, E. alchemillata, E. albulata, Coremia munitata, Thera juniperata, Hypsipetes ruberata, H. elutata, Melanthia ocellata, Melanippe hastata, M. rivata, M. montanata, M. subtristata, Camptogramma bilineata, Phibalapteryx lapidata, Cidaria psittacata, C. russata, Anaitas plagiata, Tanagra chærophyllata, Thyatira batis, Acronycta ligustri, A. rumicis, Leucania comma, L. pallens, Hydræcia nictitans, Xylophasia rurea, X. lithoxylea, X. polyodon* (also black variety), *Neuria saponariæ, Charæas graminis, Apamea basilinea, A. gemina, A. oculea, Miana fasciuncula, M. furuncula, Caradrina cubicularis, Rusina tenebrosa, Agrotis corticea, A. porphyrea, Triphæna fimbria, T. orbona, T. pronuba, Noctua glareosa, N. augur, N. plecta, N. c-nigrum, N. triangulum, N. brunnea, N. festiva, N. xanthographa, Orthosia lota* (reared from larvæ taken on sallow), *Xanthia fulvago, Cosmia trapezina* (reared), *Polia chi, Epunda viminalis* (reared), *Phlogophora meticulosa, Hadena dentina, H. oleracea, Calocampa exoleta, Cucullia umbratica, Plusia iota, P. pulchrina, P. gamma, Euclidia mi.* Larvæ of *Saturnia carpini* have been plentiful. Amongst other larvæ taken are *Dicranura vinula, Pygæra bucephala, Clostera reclusa, Notodonta camellina, N. ziczac, N. dictæoides, Smerinthus populi, Bombyx quercus* (*callunæ*), *Cymatophora flavicornis, Acronycta psi, Bombyx rubi* (very abundant on the heather). Do these caterpillars feed again in the spring? Now their favourite food appears to be sallow, which is not in leaf much before May. I could find no larvæ in the spring. When I have tried to rear them before, they have invariably died at the end of the winter.—(Miss) M. L. COTTINGHAM; Kilberry, Argyleshire, October 29th.

NOTES FROM FOREIGN PERIODICALS.

NICKEL ENTOMOLOGICAL PINS.—In order to obviate the disadvantages attending the use of ordinary pins, the firm of Emile Deyrolle, of Paris, have carried out a large number of experiments during the last two years, the object being to produce a pin which should be as nearly perfect as possible. Nickel seemed to promise the best results, but the pure metal was found to be too hard and brittle to be drawn into wire. Recourse was therefore had to an alloy, the composition of which is not divulged, containing a preponderance of nickel. This mixture, according to the author, has yielded the most satisfactory results. The price of the new nickel pins is very little above that of those generally in use. The same firm have also introduced balls of naphthaline, which are cast round a pin in such a way that they can be fastened in any part of the drawer without fear of their becoming loose.—(*Le Naturaliste*, No. 183, 233).

Asymmetry in Coleoptera.—At the Congress of Caen (the French Association for the Advancement of Science) a paper on the above subject was read by M. Albert Fauvel. Out of the vast number of species comprised in this Order, the author finds only eight cases of specific asymmetry, shown in three species of *Osorius* from Madagascar; a species of *Oxytelus* found in India, Madagascar, and the Cape; two species of *Platydema*, one from Ceylon, the other from the Island of Damar (Zimor); a *Diamerus* from Guinea and Senegal; and a *Doubledya* from Japan. A case of generic asymmetry is shown by the genus *Phytolinus* from Japan. Lastly, a case of tribal asymmetry in the four genera, *Amblystomus*, *Badister*, *Orescius*, and *Licinus*, forming the tribe of the Licini, a branch of the Carabidæ (*l. c.* 234).

Belgian and British Lepidoptera.—It is interesting to note that in a list of Lepidoptera collected by M. de Cromburghe in Belgium during the past season, out of a total of twenty-four species considered noteworthy, eighteen and one variety are also found in Britain, viz.: *Lithosia muscerda*, *Cilix glaucata*, *Stauropus fagi*, *Cymatophora fluctuosa*, *Agrotis tritici*, *Charæas graminis*, *Neuronia popularis*, *Hydrœcia nictitans*, *H. micacea*, *Xanthia fulvago* and var. *flavescens*, *Cucullia absinthii*, *Plusia moneta*, *Eugonia alniaria*, *Hadena protea*, *Tapinostola fulva*, *Hoporina croceago*, *Cidaria berberata*, *Eupithecia linariata*.—(*Annales de la Société Entomologique de Belgique*, 1894, x. 504).

Polygamy in Moths.—Polygamy in two species of North American Heterocera has been observed, viz., *Callosamia promethea* and *Anisota stigma*. In the former case a female mated with four different males, and another specimen with four different males the first day of emergence, and the following day attracted an even larger number. In the case of *Anisota stigma*, a male copulated with the same female on two successive nights, and with another female the next day.—(*Psyche*, vol. vii. No. 222, p. 155). The subject is also referred to in No. 223 of the same Journal. W. M.

RECENT LITERATURE.

M. Wytsman's Reissue of Hübner's Works on Exotic Lepidoptera.

We have already more than once called attention to this praiseworthy undertaking, which places in the hands of lepidopterists two works which have become so rare and costly as hardly to be accessible at all, except to those who are within the reach of large metropolitan libraries. All certainty in the determination of Lepidoptera rests on the correct interpretation of the older authors; and many of the illustrated books of the last century and the beginning of the present, are not only pre-eminently valuable on this account, but also for the excellence of the illustrations themselves. Nevertheless, illustrated works are not only very expensive to produce, but are generally issued in very limited numbers; and, as time passes on, they become scarcer and scarcer, for they ultimately become absorbed into public libraries and cease to pass from one owner to another. We could mention several important entomological works of which we believe there are probably not more than a hundred, twenty-five, or, in one case, possibly barely half-a-dozen complete copies in existence. But besides this, the number of public libraries keeps on increasing, and so likewise the number of entomologists who require such books; and therefore the available supply actually diminishes in proportion to the demand.

Without being quite so rare as the books to which we have alluded, Hübner's works are now very scarce, and frequently fetch an extravagant price if an occasional copy turns up; and M. Wytsman has done a real service to entomologists by offering them a reissue of Hübner's two great works on Exotic Lepidoptera: the 'Sammlung exotischer Schmetterlinge,' and the 'Zuträge zur Sammlung exotischer Schmetterlinge.'

The former of these consists of three quarto volumes of plates, each plate illustrating a single species, and consisting generally of two or four figures. Of these there are 439, the greater part representing butterflies. The first two volumes were issued between 1806 and 1824, and have a complicated nomenclature; a trinomial nomenclature being used in the first volume, and a binomial nomenclature in the second. Each volume has a title-page and index, but no other text except a few odd pages, each giving a full account of a single species, on one side the page in Latin, and on the other in German. The commencement of a third volume was issued by Geyer after Hübner's death; there is no title-page nor index to these plates, but a binomial nomenclature is used, and the plates are distinguished from the others by having the localites added at the foot.

Hübner's 'Zuträge' illustrates smaller Lepidoptera, chiefly moths; and gives an upper and under side of each species, several species being represented on the same plate. It consists of five decades, each containing figures of 100 species, or 1000 figures of 500 species in all, and was published between 1818 and 1832, the later decades being by Geyer. The letterpress is in German, but rather meagre; and the indices are good. This is one of the very few works of Hübner's to which he published the complete letterpress.

These are the valuable works which M. Wytsman is now reissuing, at a comparatively low price; and as the edition even of this reissue is necessarily limited by the probable demand, we should advise all those who require a good series of illustrations of Exotic Lepidoptera to secure it while it is still obtainable.

The seven parts which have now been published include the first seventy plates of the 'Sammlung,' illustrating seventy species of various groups of Nymphalidæ and Lemoniidæ (mostly American, though some are Indian, and a few African), many of which were illustrated in this work for the first time.

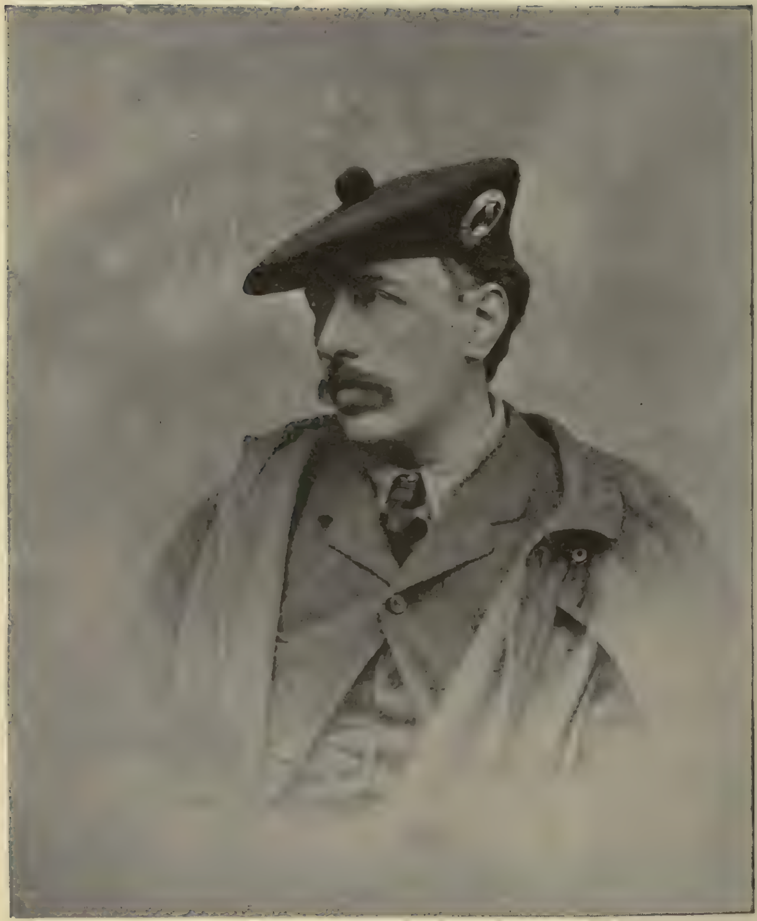
The original indices and letterpress will be reprinted at the close of the work, and Mr. Kirby has undertaken to prepare additional indices giving the modern nomenclature of the species, and to add such notes on the various species figured as may appear to be necessary or desirable. These will be printed in German, to render them uniform with the letterpress of the original works.

FRANCIS BUCHANAN WHITE.

Born, March 20th, 1842.

Died, December 4th, 1894.

AN ACCOMPLISHED STUDENT OF NATURE, AND A MASTER OF MANY OF HER SECRETS.



From a photograph by Magnus Jackson, Perth.

Yours truly
F. Buchanan White

THE ENTOMOLOGIST

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DR. F. B. WHITE.

Francis Buchanan White was the eldest son of Dr. Francis Isaiah White, for many years one of the leading medical practitioners in the city and county of Perth. He was educated at the Perth Academy until he entered the Edinburgh University. After passing, with distinction, through the regular medical curriculum at Aberdeen College, he returned to his native city; but instead of following the profession for which he had qualified, he devoted himself to the study of Natural History, in several branches of which he has done excellent work. In 1867 he delivered the inaugural address before the Perthshire Society of Natural Science, of which he was the founder and the first President. In 1871 publication of the 'Scottish Naturalist,' and the 'Proceedings' of the Society just mentioned, were respectively commenced under his editorship. He was elected a Fellow of the Entomological Society of London in 1868, and of the Linnean Society in 1873. Dr. White was the discoverer in Scotland of several insects new to the British lists, among which were *Zygæna exulans*, *Ablabia* (*Aphelia*) *argentana*, and *Zelleria saxifragæ*. Of the last named he also found larvæ on *Saxifraga aizoides* and *S. oppositifolia*.

Among the more important of his entomological writings are the following:—

Lepidoptera of Perthshire, being Part I. of 'Fauna Perthensis.'

Notes on the Insects of Strathglass, Inverness-shire. E. M. M. vii.

On Involuntary Migration in Insects. E. M. M. viii.

Notes on *Corixa*. E. M. M. x.

The British Species of *Crambus*. Scott. Nat. 1872.

On Melanochroism and Leucochroism. E. M. M. xiii., xiv.; and Entom. x.

List of the Hemiptera of New Zealand. E. M. M. xiv., xv.

New and Rare Hemiptera observed during the years 1874, 1875, and 1876, in Britain. Entom. x.

Note on certain Parasitic Fungi which attack Insects. Entom. xi.

On the Male Genital Armature in the European Rhopalocera, 3 plates. Trans. Linn. Soc., 2nd ser. Zool., vol. i.

Collecting in Glen Tilt. Entom. xi.

Note on the genus *Orthezia*. Entom. xiii.

Some Thoughts on the Distribution of the British Butterflies. Entom. xiv.

Structure of the Terminal Abdominal Segments in the Males of the genus *Eupithecia*, 2 plates. Entom. xxiv.

The present high position of the Perthshire Society of Natural Science is largely due to the energetic interest which Dr. White always took in it. At the meeting of this Society in December last, the President, referring to the great loss which they had sustained in the death of the founder and prime supporter of the institution, said :—

"I shall not attempt to lay before you to-night any detailed biographical notice of the late Dr. Buchanan White, but shall content myself with recalling to your minds, in a few words, what we owed to him as a fellow-worker in the field of scientific research and in the management of the affairs of this Society. Those of us who have had the privilege of accompanying him in Natural History rambles throughout the county know well what an accurate observer and what a genial companion he was. Nothing seemed to escape his notice, either in organic or inorganic nature. He was a specialist of the highest rank in certain branches of Natural Science, and yet he never allowed his specialism to interfere with his appreciation of Nature as a whole. Not only had he the keen eye of the trained naturalist to detect the minutest distinction in plant or insect, but he had also to a large extent the eye of the artist and the feeling of the poet to admire and reverence all that is beautiful in form or colour in Nature. This combination of faculties is the more noteworthy, as it is only too rare amongst the naturalists of the present day. As a companion in the field, none could have been more willing to contribute of his store of knowledge than he was, and yet never for a moment did we feel that the information was being forced upon us, or that there was even a trace of ostentatious display of superior attainments. Truly the humility which comes of true greatness was his. He was endowed with a large sense of humour, which made his companionship particularly charming. Every now and then, in the midst of serious work, some trivial circumstance would strike him in a ludicrous aspect, and his merry laugh could not but infect those round about him. Regarding his scientific work I shall not go into any details here, but in order to show the versatility of his genius I shall merely remind you that besides being one of the leading authorities in the country on the Lepidoptera and Coleoptera, and on the willows and certain other groups of plants, he had also worked up most thoroughly the flora of Perthshire, the land and freshwater Mollusca of Scotland, and the Fungi of large districts in Scotland. He had also studied carefully some of the difficult groups of microscopic insects, and was well acquainted with the moss and lichen flora of the country. In later years he turned a good deal of attention to geology, more especially in its relation to the distribution of plants and animals, and had a good knowledge of the geological structure of the country around Perth. I ought not to omit to mention also the work he did amongst the mammals, birds, and other vertebrates of Perthshire and the basin of the Tay. I will not presume to enlarge on the work which he did in connection with the Perthshire Natural History Museum. That museum itself is a monument which will tell to future generations the story of years of anxious thought, of patient labour, of loving care for all the things by which God made this world beautiful. Of the wisdom and forethought with which he guided the affairs of the Society all who have served on the Council know full well. Sometimes we were inclined to think that he held out too rigidly for carrying it on strictly on the lines followed by the metropolitan societies, but experience has shown that in this he acted wisely, and the benefit has been reaped in the reputation which our Society, especially in regard to its publications and its museum, has attained. At the same time it must be remembered that while he held strong opinions of his own, and was ready to express them strongly too if needful, yet he was ever ready to listen to the views of others, and to extend a broad-minded liberality towards those who differed from him."

Apart from matters pertaining to his favourite studies Dr. White did not enter much into what is known as public life, but he was seldom absent from important social gatherings. His genial manner and amiable disposition endeared him to all with whom he came in contact, and he will be greatly missed, not only in his own city and among his own people, but by that wider circle who knew him only as a correspondent or through his published writings.

SPILOSOMA LUBRICIPEDA AND ITS VARIETIES IN YORKSHIRE, DURHAM, LINCOLNSHIRE, &c.

By W. Hewett.

(Concluded from p. 8.)

Var. *eboraci.*—This, in my opinion, is by far the most interesting variety of *S. lubricipeda*, and occurs more abundantly in the neighbourhood of York than elsewhere, though it is by no means confined to the environs of our fine old city, or indeed to the county, as it occurs to my knowledge at Driffield, Darlington, and Hull; also in Lincolnshire. See Mr. Fletcher's remarks already quoted.

Mr. Carrington's statement (Entom. xxiii. 207) that *S. lubricipeda* var. *radiata* (meaning by *radiata* the var. *eboraci*, which, until the introduction of Mr. Harrison's form, was erroneously called *radiata*) only occurred in a timber-yard close to the railway station between the years 1860 and 1870, may have been correct at that time, although from the evidence I have obtained of its present distribution I very much doubt it. However, it certainly would not hold good at the present time, as the var. *eboraci* or York form is and may be bred from larvæ collected in any part of the city or outskirts, but is most certainly not so common as one would infer from Mr. Porritt's notes on the radiated varieties of the genus *Arctia*, where that gentleman states the var. *radiata* (meaning the var. *eboraci*) is not at all uncommon about York.

Among some 150 *lubricipeda* bred this season from York larvæ, I only got three specimens of the var. *eboraci*, two males and one female; in addition to these some twenty intermediate varieties. Forms of *lubricipeda* much darker than the type and approaching, but still distinct from, *eboraci* as figured, are certainly not of uncommon occurrence, when the species is bred in considerable numbers. These forms also occur fairly commonly at Hull and Darlington. I recently inspected the grand lot of varieties of *lubricipeda* bred by, and now in the possession of, Mr. George Jackson, York; his series consisted of 15 rows, each row having from 20 to 22 specimens, or some 315 examples in all. About 50 were true *eboraci*, as figured (Entom. xxvii. p. 205); the remainder were principally varieties, very closely resembling *eboraci* and connecting that form with the type. The whole of these fine forms had been selected by Mr. Jackson from many thousands of *lubricipeda* which he had bred during the last few years.

Var. *fasciata*.—Mr Jackson had numerous examples, both male and female, of this form, and several very nearly approaching it. This variety also occurs not uncommonly at Scarborough, Hull, Darlington, and Driffield. Some half-dozen examples had the hind wing marked very much like those of the var. *radiata*, and the fore wings not so strongly marked as in *eboraci*. For this variety, which is recurrent, and of which I have two in my collection from Hull and Driffield respectively, and which also occurs at Darlington, I would propose the varietal name of *semiradiata*. Another uncommon variety has five small dots on each of the fore wings arranged as follows: one in centre of costa, two near the tip, and two in centre of inner margin; hind wings spotless. Five of the specimens were very interesting varieties, and quite distinct from either *eboraci* or *fasciata*, being identical with figure 1 E on plate 76 of Barrett's 'Lepidoptera'; indeed, this figure is drawn from a specimen formerly in the possession of Mr. Jackson. This form is most certainly much rarer than any other of the known varieties, excepting perhaps that extremely rare aberration in which the spots are almost if not entirely wanting from both front and hind wings, of which Mr. Jackson possesses two examples. The only immaculate specimen I have seen or heard of is that in the possession of Mr. Capper, of Liverpool, which I had the pleasure of viewing when looking over that gentleman's magnificent collection in August, 1893; probably this specimen is unique; it is a white female. Mr. Jackson has reared *lubricipeda* from larvæ collected all round York, and not merely from one particular locality, for the past thirty years, and during the past twelve years especially, in great numbers; but he has never bred *radiata*, nor any form very nearly approaching it. Mr. Robert Dutton, of this city, has some twelve examples—seven males and five females—of var. *eboraci*, and one or two of the var. *fasciata*, as well as numerous intermediate forms; these he had selected from a great number of specimens reared from York larvæ. In the collection of the late Mr. Robert Cook, of this city (which, through the kindness of his widow, I recently had the opportunity of inspecting), there are three or four varieties corresponding to *fasciata;* one of these had both fore and hind wings of a uniform dark ochreous colour, the fore wings especially so. There is a very similar specimen, only with not such pronounced markings, in the Allis collection.

I have this year bred some 500 *lubricipeda* from larvæ and pupæ obtained from Hull, and from these some very nicely marked forms resulted, including two examples of the var. *eboraci*, both females, and some half-dozen *fasciata;* also an example (a female) having the hind wings similar to *radiata*, *i. e.*, smoky black, the basal area, wing-rays, and fringe being cream-coloured, the head and thorax cream-coloured, body yellow, with six black spots down the middle and on each side, antennæ simple, fore wings rather thickly marked. This is the variety for which I propose the name of *semi-radiata*. I have a very similar specimen, also a female, taken at rest, near Driffield, but this has the fore wings typical. Nearly all the forms I selected from the Hull lot have this feature peculiar to them, *viz.*, that the hind wings are much more thickly marked in the female than are the York forms.

Mr. Fletcher, writing of the variation in specimens of *lubricipeda* from Hull, says:—"From the Hull pupæ of *lubricipeda* I bred some strongly-marked specimens in 1893. Luckily I had a pairing of two of them, and have bred this year several moths of the *fasciata* type, and the rest of the batch with well-pronounced tendencies towards it. From two of the best-marked specimens I have again obtained pupæ."

Mr. Porritt, by crossing a female *fasciata* with a male *radiata*, produced specimens of *radiata* forms nearly approaching *fasciata* and var. *eboraci*, thus showing that heredity holds good in this species. Mr. Tugwell suggests that the York city form resulted from just this kind of cross, and, after fully considering the *pros* and *cons* of the suggestion, I think it the only satisfactory explanation to be arrived at.

The Rev. C. D. Ash, Skipwith, near Selby, informs me that in 1880 he "took, on the sandhills a little north of Mablethorpe, a male *lubricipeda* almost identical in markings with var. *eboraci;* the ground colour was very pale, and the black streaks on the costa and inner margin were not so pronounced." At Saxby, Lincolnshire, in 1893, he only found the type. The Rev. G. H. Raynor, Panton Rectory, Wragby, informs me that he "has never taken any varieties of *lubricipeda* in Lincolnshire."

Mr. Allan Nesbitt, of Llandago, Chepstow, says that *lubricipeda* varies little with him. Mr. D. Chittenden, of Ashford, Kent, says that specimens of *lubricipeda* which he has bred from Ashford and neighbourhood are very much lighter than some selected examples which I sent him.

With regard to the all-important question which has been and is repeatedly asked me by very many entomologists, *viz.*, "Do you think the introduction of *radiata* to be genuine?" in order that no misunderstanding may exist as to what I believe or do not believe, I may say, as the result of all my investigations, I am firmly convinced that it is genuine, and that Mr. Harrison is entitled to our warmest congratulations for his marked and well-merited success. Mr. Harrison has still another and perhaps more interesting surprise in store for us, the result of careful artificial selection on his part; this I will leave him to announce, and merely add that the species selected belongs to the same interesting genus. In conclusion, I desire to thank most heartily all those gentlemen whose names I have mentioned in this paper, also very many whose names do not appear, for the material aid they have rendered me, both by their kind and ready replies to my enquiries, and for affording me special facilities for the inspection of their collections.

THE SENSE ORGANS OF INSECTS: A SPECULATION.

By John Watson.

Mr. Arkle, referring to the senses of Lepidoptera (Entom. xxvii. 338), says, "There is no evidence in favour of an additional sense existing; there is no organ we can point to for its exercise; there is, in short, no need for it." I would say in answer to this, What about the antennæ? That there is some special function attached to that of the male is evident, or why such very specialised development in this sex as against that of the ordinary female? There is no need for this development for the purpose of scent, because, as shown by Mr. Arkle, scent can only be demonstrated to the animal through its breathing-organs; and *touch* is as necessary to the female as to the male, for where we find antennæ used for touch we find these organs equally developed in both sexes, as in Rhopalocera, Hymenoptera, &c.

That there is no impossibility in the possession of an additional sense, we have proof in the pituitary body of vertebrate embryos found at the *anterior part of the nervous system*, and which cannot now be accounted for other than as the last vestige of an organ functional to a sense *now* unknown to vertebrates, but possessed in full vigour by the vertebral prototype. If there be another sense, it is possible it is located in the antennæ. That a structure originally developed for one special function can become partly or wholly atrophied, and later take on a function entirely different from its original one, we also have abundant proof. One of the gill-clefts of fishes, found in the highest developed fishes as merely slits and functionally used in *breathing* water, is found in all vertebrates higher developed than fishes, as the Eustachian tube and the meatus auditorius, quite open in some rare cases, and, in cases of fracture of the tympanum, as a tube from the throat to the external ear; the external half of this cleft has been diverted from its original function to that of a sound-channel, to carry the vibrations from the external ear to the tympanum, which is a thin film dividing the tube, so that sound-waves coming along it strike the tympanum and cause it to vibrate. When, through shock or concussion, the tympanum is fractured, air or fluid in the throat can be forced along this Eustachian tube through the ear; this act is analogous to the expulsion by fish of water in their mouth through their gills.

Mr. Arkle says that Lepidoptera do not hear; that a gun report does not startle them, it produces no symptoms of alarm. Is it not possible that there are qualities of sound to which these insects are sympathetic, and that such qualities have not yet been produced by artificial means, and are beyond the power of human ears to record? This is merely a speculation as perhaps bearing on the use of the antennæ, as we know that the very piercing squeak of the bat has so many vibrations to the second in its harmonic composition that it is beyond the power of the ordinary human ear to become sympathetic with it, and therefore the squeak is inappreciable usually to our ears.

That it is not beyond the region of possibility that the antennæ of Heterocera play some part in the exercise of hearing is borne out by the investigations of Mayer, Landois, and Hurst in regard to *Culex*, the gnat. It is now admitted that the singing of the gnat over one's head in the damp lanes is merely the call of the female for the male; this has been investigated in the living subject by Mayer and Landois, and histologically demonstrated by Dr. C. Herbert Hurst, of Owens College, Manchester.*

There is at the base of the antenna of the male gnat a cup-shaped process, the highly pectinated antenna emerging from the centre of the base of it. This cup is the external *ear*, and is intimately connected with the nervous system. When a note is given out, harmonically designated UT_4 (512 vibrations to the second), either naturally or artificially produced by a tuning-fork, and the axis of the antenna is pointing in the direction from which this sound comes, then the fine pectinations (setæ) of the antennæ vibrate in unison to the sound-waves. This causes the shaft of the antenna to contract and elongate with the vibration, and thus a stimulus is set up and transmitted by the nerve of the antenna to the very large cerebral ganglia.

Landois has demonstrated that the female gnat has attached to the spiracles two filaments (analogous to the vocal cords of vertebrates), and, as in vertebrates also, when air is forced through them, a sound is produced which has also 512 vibrations or thereabouts to the second. Now let us apply the two things together: suppose a gnat (female) is in a room, singing her song of UT_4; if there is in the room and within radius of the penetration of this note a male, and its antennæ are pointing in the direction of the female,—and we have plenty of evidence that they will soon do this, as its antennæ are hardly ever still, but always *feeling* for its mate's song,—then the setæ are set vibrating, which is communicated down the shaft to the ear and from the ear to the nervous system; thus the male is apprised of the nearness and direction of its mate. This susceptibility to sound of the male antenna has been beautifully worked out by Mayer; Dr. Hurst (*l. c.*) says, "Mayer has performed some experiments which throw a good deal of light on both these questions. Having fixed a male gnat upon a slide, he examined the hairs on the shaft of the antenna, and found that when certain notes were sounded with tuning-forks certain hairs vibrated so that their outlines became indistinct, and this effect was most marked when the tuning-fork UT_4 was sounded, giving 512 vibrations per second, this note setting the greatest number of the large hairs in violent vibration, but only when the sound came in such direction as to strike the hairs at right angles, or nearly so—that is to say, these hairs vibrate when this sound is produced at a point towards which the antenna is pointing."

Mr. Arkle says, "But assembling is evidently habitual in species without these very antennæ"; and I would add to this that *scent* is not, evidently, the *only* determining influence in assembling, for the Rev. G. H. Raynor (Entom. xxv. 121) says that "even during a stiff breeze I have seen males come up from all quarters of the compass." This would imply that scent was not the only lure, and tends towards proof that some other influence was at work, as *scent* cannot travel against the wind, and in all the assembling expeditions I have been on, the males always came against the wind; and when, in their eagerness, the males overshot their mark and went past the female, they lost the scent and flew up, soared away on the wind, dropped close to earth again, and then, having regained the scent, came sailing along.

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* 'Transactions of the Manchester Microscopical Society,' 1890, "On the Life-history and Development of a Gnat,' by C Herbert Hurst, Ph.D.

The fact, as stated by Mr. Arkle, that the report of a gun does not disturb insects, would help out the fact that *if* Heterocera can hear, it must be some sound whose composition is the antithesis to that of a gun-report, *e. g.*, one which will be shriller, having more vibrations than a gun-report, and therefore in its character something in the way of the song of the gnat.

MACRO-LEPIDOPTERA OF THE BURGHCLERE DISTRICT IN 1894.

By E. G. Alderson.

In spite of very uncertain weather and a general prevalence of cold winds, the season of 1894 afforded me far better sport than I was able to get in the wonderfully hot and dry summer of 1893. There was more variety in the species taken, and from April to October there was a steady succession of seasonable captures. Here, in 1893, we had a brilliant but very short period of prosperity, with *Macroglossa fuciformis*, *Bombyx rubi*, *Melitæa artemis*, and other good things all out a full month before their time; and then, with the dull weather in July, the stream of insect life seemed suddenly to dry up, and autumn species, as far as I was concerned, were a complete failure. Perhaps the extraordinary heat told upon the collector as well as upon the insects, and want of energy may have had something to do with the empty setting-boards of August and September; but the fact remains that the autumn of last season was in striking contrast, and brought a number of very acceptable species.

The range of my observations extended as far as Winchester on the one hand and Savernake on the other. The occasional excursions, not half a dozen in all, which I made to these places, added very little to my list, which is practically made up of species taken in the garden attached to my lodgings—most of them by light, at the window of the room where I am now writing.

Winchester and Savernake, in fact, only gave me one capture each that was worth recording. On June 16th, at St. Catherine's Hill, I took *Lycæna adonis* for the first time, and saw, but failed to catch, *Callimorpha dominula*. A visit to Savernake on August 18th—a horribly dull and windy day—produced four *Thecla w-album*, all taken in one spot—a little clearing which contained a patch of thistles. On these thistle-heads the hairstreaks kept company with a very lively colony of *Charæas graminis*. Whether owing to the spiky nature of thistles, or to the bustling and pugnacious habits of their neighbours, the four hairstreaks were all sadly battered, and not one of them was worth setting.

I noticed some two dozen species of Rhopalocera at Burghclere. The best of these were *Colias edusa*, a fine fresh male, on August 13th; *Satyrus semele; Vanessa polychloros*, which was plentiful after emergence from hybernation in the spring but scarcer later on; *Lycæna corydon*, *L. alsus*, *L. agestis*, all abundant on Beacon Hill; and a few *Pyrameis cardui*. I had noticed in 1893 a regular brood of small *Anthocharis cardamines;* I have an entry under May 10th, recording the capture of three individuals that morning, none of which exceeded *L. alexis* in size. The discussion upon this variety induced me to try and obtain specimens this season, but though the type was abundant as ever, only one dwarf could be found, and, except in point of size, it presented very little variation from the average male. The most striking difference appeared to lie in the great comparative size of the green marblings on the hind wings beneath. These were nearly as open as in the type, and had an unusual effect in so small an area. The black spot on the fore wings was well within the orange tip.

Sphinges were disappointing, but of the genus *Smerinthus* I got two, *S. ocellatus* and *S. populi*, both taken at light. *Macroglossa fuciformis*, *M. stellatarum*, and *Chœrocampa porcellus*, all of which I found in 1893, did not appear. The weather was very bad when they were due, and the same cause may have been fatal to *Bombyx rubi*, which swarmed last year from April 24th. *Hepialus humuli, hectus,* and *lupulinus* were very common; of the last I got a fine white variety. *Lithosia mesomella* and *L. complanula* were both taken at light. *Euchelia jacobææ* was rather scarce, but *Chelonia plantaginis* was abundant at Beacon Hill. I got *Odonestis potatoria* at light, and in April netted a few *Saturnia carpini*, which however was by no means so abundant as in 1893.

Among the Cuspidates *Cilix spinula*, *Platypteryx falcula*, *Ptilodontis palpina*, and *Notodonta camelina* were all that my lantern could beguile, and they came but very seldom. The bulk of my visitors were Noctuæ, and this was fortunate, for sugaring was not an atom of good. From April to October, on nearly all dark nights my room was sounding like an æolian harp, from the time that the lantern first appeared in the window up to one o'clock a.m. It was often almost impossible to read with comfort, and I would lay down my book to listen to the babel of undertones that filled the air. What differences of moth temperament are revealed by the deep bass hum of the heavy Agrotidæ, the vulgar bluster of *Heliophobus popularis*, and the gentle, nervous fluttering of *Rusina tenebrosa!* But to quit sentiment and come to reality, I may say that under all these various and superficial characteristics there seemed to lie a general disposition to oblige, and very soon every available inch of my setting-board was crowded with my nocturnal visitors. My first reception, so to speak, was held on March 29th, when *Tæniocampa instabilis* and *T. cruda* came in, quickly followed by *T. stabilis*, *T. gothica*, and some early Geometers. The moths were capricious, but on most suitable nights there was a fair show, and the muster was irregular in quality rather than in quantity. The lantern generally filled the room with moths of some sort, even if nine-tenths of them were of some one plebeian species like *Agrotis exclamationis* or *Arctia lubricipeda.* But on occasional evenings it would be apparent from the very first that variety was about to exercise its charm. Such pests as *Agrotis exclamationis* and *Xylophasia polyodon* would retire, and the first half-dozen arrivals would be of different species, some of them, perhaps, new to me. Chiefly by the help of a few such precious occasions I managed to put together the following list of Noctuæ:—

Leucania conigera, L. lithargyria. L. comma, L. pallens, Tapinostola fulva, Hydrœcia nictitans, H. micacea, Xylophasia lithoxylea, Neuria saponariæ, Heliophobus popularis, Apamea testacea, Luperina cespitis, Apamea gemina, A. oculea, Miana strigilis, M. fasciuncula, Grammesia trilinea, Caradrina morpheus, C. alsines, Rusina tenebrosa, Agrotis segetum, A. exclamationis, A. cinerea, Tryphæna orbona, Noctua augur, N. plecta, N. c-nigrum, N. festiva, N. dahlii, N. rubi, N. xanthographa, Anchocelis rufina, A. pistacina, A. lunosa, Scopelosoma satellitia, Xanthia cerago, X. silago, X. ferruginea, Tethea subtusa, Dianthœcia carpophaga, D. capsincola, D. cucubali, Hecatera serena, Miselia oxyacanthæ, Phlogophora meticulosa, Hadena adusta, H. dentina, H. oleracea, H. thalassina, Abrostola urticæ, Plusia chrysitis, Amphipyra tragopogonis, and *Catocala nupta.* Besides these captures at light, I extracted from the long grass under my windows plenty of such day-flying Noctuæ as *Heliothis arbuti, Phytometra ænea, Euclidia glyphica*, and *E. mi.*

My best captures in this group were undoubtedly *Agrotis cinerea* and *Luperina cespitis.* Of the former I only got two early in June, but during the last week in August *L. cespitis* began to come in such numbers that its visits were tolerated rather than encouraged. Some of the specimens were very fine and strongly marked.

Light proved very useful with the Geometers also, and I took many species in this way whose presence in the neighbourhood I had never before suspected. Among those seen or captured at light were *Odontopera bidentata*, *Ennomos tiliaria*, *Himera pennaria*, *Boarmia rhomboidaria*, *Strenia clathrata*, *Lomaspilis marginata*, *Oporabia dilutata*, *Eupithecia venosata*, *E. centaureata*, *Lobophora polycommata*, *Hypsipetes elutata*, *Melanthia ocellata*, *Melanippe unangulata*, *Anticlea derivata*, *Cidaria propugnata*, *Scotosia dubitata*, *Cidaria miata*, *C. truncata*, var. *centum-notata*, *C. testata*, *C. dotata*, *C. fulvata*, *Eubolia cervinaria*, *E. bipunctata*, and *Anaitis plagiata*. Besides these, I beat up or netted in the evening, *Venilia maculata*, *Ellopia fasciaria*, *Crocallis elinguaria*, *Pseudoterpna cytisaria*, *Iodis lactearia*, *Asthena candidata*, *Acidalia remutata*, *Corycia temerata*, *Macaria liturata*, *Bupalus piniaria*, *Aspilates strigillaria*, *Emmelesia affinitata*, *E. decolorata*, *Eupithecia nanata*, *Cidaria suffumata*, *Eubolia mensuraria*, and many others. The neighbourhood is, I am convinced, specially rich in Geometers, but I could not work them adequately.

My experiences of mothing with a light were often very puzzling and contradictory. Some dark nights were quite unproductive, and some moonlight nights gave me a good variety of species. I used to light up about 7.30 in spring and in autumn, and at 8.30 in summer; and though I tried many experiments, the results seemed to prove that it was useless to begin earlier. If I did, the moths still appeared at the old time, with a regularity that almost suggested their expectation of the light at a fixed hour. The only rule that seemed to hold good in all cases, however, was that whatever might be the weather in temperature, a great falling off was always noticeable between 9.30 and 10.30 p.m.; and, curiously enough, the moths that had already got into the room punctually observed this hour of repose, and settled down quietly upon the walls and ceiling. A fact which to me became very significant was, that if these sleepers became restless during the quiet interval, the disturbance nearly always immediately preceded a fresh arrival from without. So regular was this correspondence, that if any of the moths which dotted my walls and ceiling began to move during the quiet hour, I always took up the net in anticipation of the sharp tap at the window which announced a new comer,—an anticipation which seldom failed to be realised immediately.

Burghclere, Newbury, Dec. 10th, 1894.

THE COPROPHAGOUS LAMELLICORNS: A LIST OF SPECIES BELONGING TO THE GENERA *CIRCELLIUM* AND *SCELIAGES*, WITH NOTES ON ATEUCHIDÆ.

By John W. Shipp.

Circellium, *Latr.*

Règne Anim. 2nd ed. iv. p. 535 (1829); Lacord., Gen. Coléop. iii. p. 70; Blanch., Cuv. Règne Anim. i. p. 292 (1854).

1. *bacchus*, Fb., Sp. Ins. i. p. 32; Mant. Ins. i. p. 17, n. 163; Herbst, Käfer, ii. p. 297, t. 19, f. 4; Lacord., Gen. Coléop. iii. p. 70; Oliv., Ent. Col. i. p. 153, pl. 17, f. 161; Blanch., Cuv. Règ. Anim. pl. 39, f. 4.
   hemisphericus, Pallas, Icon. p. 20, t. B, f. 23.
var. *lyceus*, Westw., Brit. Cyclop. ii. p. 55; Reiche, Ann. Soc. Ent. Fr. 1842, p. 81; Lacord., Gen. des Col. iii. p. 70.
var. *waterhousei*, mihi.

Hab. 1, 3.—Cape Colony (widely distributed); Transvaal; Natal; Zambezi River; Matabili-land.

Only the above species has been described as belonging to this genus, which is easily distinguished from the other Ateuchidæ and Copriidæ by its hemispherical shape and its obtusely rounded clypeus. The var. *lyceus* was applied by Westwood to the large shining examples of *bacchus*, but as this is no distinguishing feature the name will probably have to become a synonym.

I have just had the opportunity of examining a series of insects captured in Matabili-land during the recent outbreak, and was struck with a few extremely diminutive forms of *bacchus;* and, as all of them are without exception under 16 lines, I take the opportunity of describing it as follows:—

bacchus var. *waterhousei*.—Size smaller, punctures on disc of thorax thick, coarser round base and margins, the posterior margin strongly sinuate. The striæ on the elytra deeper, and the basal portion of the elytra not crenulate as in *bacchus*, of a dull black colour, the hind tibiæ being furnished with a number of short spines very close together, and more numerous than in *bacchus;* the spines or teeth in one or two examples are obsolete, being evidently worn away by friction; the carinæ on the metasternum scarcely visible and almost obsolete; metasternum impunctate. L. c. 15 lines (16 = 1 in.). Hab. Matabili-land.

Sceliages, *Westw.*

Proc. Zool. Soc. v. 1837, p. 12; Westw., T. Z. S. ii. p. 159 (1838); Lacord., Gen. Coléop. iii. p. 71.

1. *adamastor*, Serville, Encycl. Méth. x. (1825), p. 351; Lacord., Gen. Coléop. Atl. t. 26, f. 2.
   microcephalus, Boh., Ins. Caffr. ii. p. 174.
   iopas, Westw., P. Z. S. v. (1837), p. 12; T. Z. S. ii. p. 159, t. 29, f. i. (1838).

1.—Cape Colony; C. Good Hope; Port Elizabeth; Natal; Caffraria.

2. *hippias*, Westw., P. E. S. (1844), p. 100; T. E. S. iv. (1847), p. 226, pl. 17, f. 2.
   Hab. Cape Good Hope; Afr. Merid.

3. *gagates*, n. sp. Limpopo River.

I. Clypeal teeth rounded at extremity; size smaller.	
A. Species larger; finely punctured (in some cases the punctures are almost obsolete); elytra with the striæ only faintly visible, depressed on disc, and more elongate .	*adamastor*, Latr.
B. Species smaller; striæ of elytra deeper, elytra more convex and rounded, not so depressed on disc	*hippias*, Westw.
II. Clypeal teeth sharply pointed at apex; size larger; mesonotum with a deep longitudinal furrow	*gagates*, mihi.

gagates, mihi.—Black, shining. Head not elongate; teeth quite pointed, centre indentation quite triangular, the teeth being slightly reflexed. Head strongly punctured, except on disc, where it is quite smooth; strongly margined. Thorax strongly but finely punctured at sides, sparingly on disc, the punctures being thicker in the anterior angles; strongly emarginate. A faint longitudinal line can be plainly seen on disc. Anterior angles of thorax only slightly produced. Cilia at the base of the thorax rather long and deep brown. Elytra six-striated, the striæ being shallow but distinctly visible, rather strongly punctured; interstices flat, very sparingly and finely punctured. Elytra depressed on disc, base bicarinate. Anterior tibiæ very strongly toothed, all the teeth being sharply punctured and squamose at tips; the dentations very strongly serrated, the inner margins being unevenly serrated. Mesonotum not punctured, with a deep longitudinal furrow. L. c. 14 lines. Hab. Limpopo River.

adamastor, Latr. = *iopas*, Westw.—Black, shining. Clypeus elongate, depressed, six-lobed; the two centre teeth rounded, semicircular in shape, strongly emarginate. Head obsoletely margined, covered with small irregular punctures, except on the posterior portion, where the punctures are obsolete. Thorax smooth, obsoletely punctured, strongly margined, with the margin serrated, and with a testaceous cilia; upper margin smooth. Elytra furnished with six striæ, the striæ being almost obsolete, and the elytra very faintly punctured; in a few cases the punctures are indiscernible. Apex of anterior tibiæ bent inwards at extremity and dilated, the teeth being slightly deflexed and serrated; the apical tooth rounded at extremity, not pointed. Mesonotum rather thickly punctured with very fine punctures, and with an obsolete longitudinal furrow, in some cases smooth, slightly concave or depressed towards posterior extremity. L. c. 10 to 12 lines.

Westwood described *iopas* as follows:—"Ater, nitidus, lævis; clypei dentibus intermediis, duobus obtusis subelevatis, capite antice punctatissimo; thorace lævissimo; elytris punctis nonnullis minutissimis, irregularibus, striisque sex longitudinalibus simplicibus fere obliteratis. L. c. 10 lines."

hippias, Westw.—The description of *hippias* is as follows:—"Niger, nitidus, capite sub lente tenuissime punctato; clypeo cornubus duobus intermediis porrectis; pronoto fere lævi, elytrisque sublævibus et minus nitidis, singulo striis sex vix discernendis; tibiis anticis haud in medio angulatis, extus 4-dentatis et serrulatis, metasterno antice producto et convexo-prominulo. L. c. 8 lin." Distinguished from *adamastor* by its less dilated form, as well as by the above-mentioned characters.

I confess that I fail to perceive any distinction between *adamastor* and *iopas*; a specimen in the Hope Coll. is labelled *adamastor*, but is only a trifle larger than those labelled *iopas*, and does not differ in any other particulars. *Hippias* is certainly a smaller and rounder insect than either of the two preceding species, with its form more convex. Lacordaire's figure of *adamastor* is evidently taken from Westwood's figure of *iopas*.

NOTES ON THE ATEUCHIDÆ.

In my paper on the above genus (Entom. xxvii. 257) I stated that no species of the genus had been found upon the island of Madagascar. Since then, on looking through the Nat. Hist. de Madagascar Ins. Col., I find that D'Herculais has figured a species (pl. 17, f. 1), which is named *radama*. No description is as yet given, but the species does not seem to be identical with any of the East African examples. It is of a shining fuscous-brown colour, and sparingly punctured.

Herr Reitter (Verh. Vereines. Brunn, xxxi. pp. 160–163) gives the following as the synonymy of the Palæarctic species:—*Sacer*, Linn. = *typhon*, Fisch. = *carinatus*, Gebl. = *europæus*, Mots. = *acuticollis*, Mots. = *affinis*, Brullé = *retusus*, Brullé. *Pius*, Ill. = *infirmus*, Fisch. = *monachus*, Fald. = *digitatus*, Mots. *Puncticollis* = *armeniacus*, Mem. = *hypocrita*, Dej. = *parumpunctatus*, Klug.

The genus *Mnematidium* was founded by Ritsema in 1889 for the name *Octodon*, Lansberge,* but Reitter uses Bedel's name

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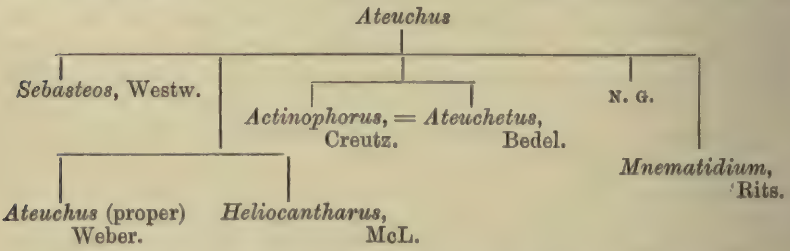
* See the Synonymy (Entom. xxvii. 314).

Neoctodon for *multidentatus*, Klug. This is an error (Entom. xxvii. 314). Reitter, however, uses Ritsema's genus *Mnematidium* instead of *Mnematium*, McLeay (*ritchei*, McLeay = *silenus*, Oliv.). This is also incorrect, as *Mnematidium multidentatum* is greatly dissimilar to *Mnematium ritchei*, McL. *Mnematium*, McLeay, and *Pachysoma*, Kirby, belong to the second division of my section Ateuchini, having the head and thorax very convex, more rounded, and shorter, and with the body wingless.

Bedel's subgenus *Ateuchetus* includes such forms as *cicatricosus*, Lucas, *puncticollis*, *semipunctatus*, and *variolosus*. These species agree with *Actinophorus*, Cr., as restricted by Erichson and others, although the genus *Actinophorus*, as given by Erichson, will bear dividing up into two distinct groups.

I append a diagram showing how the present genus *Ateuchus* may be divided :—



The following specimens are not mentioned in my list :—

ganglbaueri, Reitter, Verhandlung des Naturf. Vereines in Brunn, xxxi. (1892), p. 162. Hab. Persia.

laticollis, Linn.
  var. *striolatus*, Reitter, *l. c.*, p. 163. Hab. Italy; Morocco.
  var. *semilunatus*, Xambeu, Ann. Soc. Ent. Fr. vol. 63, Bulletin, p. ccxxvi. Hab. Pyrenees.

THE IRREGULAR DIARY OF AN ENTOMOLOGIST, 1832—1860.

Some time ago Mr. W. T. F. M. Ingall most kindly sent me a type-written copy of some entomological memoranda made by his father, the late Mr. Thomas Ingall, formerly of the Bank of England, and one of the original members of the Entomological Club, and also of the Entomological Society of London.

As was the case with many of his contemporaries, Mr. Ingall did not confine himself to any particular order of insects, but collected anything that came in his way—Coleoptera, Diptera, Hymenoptera, Lepidoptera, and Neuroptera seem to have been equally interesting. Read by the light of our present knowledge of the insects referred to in his diary, many of the entries therein are very interesting, and as the gentleman to whom I am indebted for a copy of the diary has very courteously given me permission to publish extracts therefrom, I have selected the following:—

"August 1st, 1832.—To-day I have obtained from Mr. Lambert a most extraordinary specimen of *Limenitis camilla*, the upper surface of which has only a very small portion of the usual white bands which cross the wings. It is on the right posterior wing; beneath, nearly the whole of the white band and markings are wanting. I gave him 1s. for it. It was taken at Colchester, in Essex, and he informs me that he also saw one other similar, but was not fortunate enough to take it. The insect was very numerous this season, but owing to the high wind he did not take many." When we remember that in Haworth's time *L. sibylla* was known in England as "*L. camilla*," we shall understand that the purchaser had not been "taken in," but on the contrary obtained a good variety at an exceedingly low figure, if comparison is made with the prices such examples realise at the present day.

"August 25th, 1835.—Mr. Bennett informs me that the pale clouded yellow (*Colias hyale*) has been taken within the last few days, in some fields to the right and left of the bridge over the canal at New Cross. Mr. B. has taken three specimens at Box Hill this year."

"September 10th.—Went to Mr. Newman's. He gave me a worn specimen of *C. hyale*, which he took in the above locality with eight others. He knows a man who took seventeen others at the same place and about the same period. Altogether he has heard of fifty-one specimens taken in different parts of the country, and *C. edusa* in profusion near Gravesend. Last Sunday a specimen was seen in Battersea Fields, and another at Dulwich. He has also heard of three specimens of *P. daplidice* being taken at Dover this year, and *Melolontha fullo* at Margate. *Papilio podalirius* has also, it is said, been taken—three specimens, of which Mr. Curtis has one. I last night learnt from a gentleman who was at Mr. Stephens', that the day before yesterday he saw a specimen of *Vanessa antiopa* on the borders of Epping Forest, which passed while he was in a carriage." Perhaps the most important items in these entries are the records of the two species of *Colias*. At the present time *Melolontha fullo*, perhaps better known as *Polyphylla fullo*, is not recognised as British, and *Papilio podalirius* is not placed on our lists as a native.

"July 3rd, 1836.—Took a cocoon of *Clisiocampa* [*Bombyx*] *neustria* which contained two pupæ, male and female. I could not perceive the exuvia, when I tore open the cocoon, of more than one larva. I will not however positively assert there were no more, as it is possible it may have dropped out at the moment of tearing the case open and escaped my observation; but there certainly was only one case for the two pupæ."

"July 9th.—Mr. Bennett gave me two specimens of *Pieris* [*Aporia*] *cratægi*, both males; two of *Abraxas ulmata*, and one *Gnophria rubricollis*, all taken at Ross in Herefordshire, within the last month."

"May 25th, 1841.—About two years ago Mr. Ed. Doubleday gave me an old honeycomb and beehive, from which I bred a specimen of *Galleria alvearia* [*Achrœa grisella*]. It was afterwards thrown aside in a cellar, but the other day I accidentally discovered one of the moths in the house, and on going to the hive found them in abundance. I have bred at least 400 specimens."

"June 7th.—Received from Mr. H. Doubleday, who is now at Whittlesea Mere, a small box by post with five larvæ of *Lycæna dispar*."

"June 20th.—About three or four days ago one of the above went into chrysalis, but two appear to be dead. Mem.—Of the five larvæ I bred a male and female; one larva died and two produced ichneumons."

June 6th, July 23rd, and July 30th, 1842.—The entries under these dates refer especially to large numbers of *Bombyx castrensis* from the Isle of Sheppey, and his difficulties in rearing them. He appears, however, to have been fairly successful, as by other entries it seems that he bred sixty male and thirty-five female specimens, together with a gynandrous example recorded as follows:—

"August 7th.—Bred one hermaphrodite. This extraordinary specimen has the left half the appearance of a pale male, and right a dark female. The division of colour on the thorax is very apparent. The upper part of the body is of the same colour as the females usually are, but beneath it is longitudinally divided into dark and light, as are also the legs."

The next item in the same year is an important one, if the insect referred to was correctly identified, as the locality seems to be one not hitherto recorded:—

"August 15th.—At Shirley I took about half a dozen specimens of *Crambus latistrius*, but only one fine. I found them on the piece of waste ground by the sand pits going from Shirley to Wickham." On the 18th thirty specimens of this species were taken, "most of them in bad condition. In colder seasons they probably are in perfection about this time. I found them more widely distributed to-day."

"August 23rd.—Saw Samuel Stevens to-day and find he has taken fifty-one specimens of *Colias hyale*, which has made its appearance in the following places this year [1842], and in some abundantly:—Epping, St. Osyth, Chalk, Deptford, Highgate, Arundel, Yorkshire, Northampton."

Under the date of September 5th "a specimen of *Catocala fraxini* which Mr. S. Stevens took at Hammersmith off a willow, with sugar, a few evenings ago," is mentioned as having been seen at the Entomological Society.

"July 17th, 1845.—At Clapham Common, this morning, I took one or two specimens of *Agrotis corticea* by beating the limes, but I ought to have gone two or three days ago. Some of my larvæ of *castrensis* [taken at Sheppey on the 11th and 12th] have spun up, but others are dead. A considerable number of *Æ.* [*Sesia*] *ichneumoniformis* have been taken at Charlton within the last fortnight. Mr. Shepherd took sixteen in one afternoon. Last week Mr. Douglas took *Smaragdarius* [*Phorodesma smaragdaria*], one of the emeralds, at St. Osyth; five were taken. It probably may be met with at Sheppey, on the east coast. Mem.—Endeavour to get to Sheppey for a week next year, about the beginning of July. A new *Eupithecia* [*togata*] has been taken at Black Park within the last three weeks, and in considerable numbers."

"July 31st.—I find my *castrensis* caterpillars will eat oak. They also seem to like the common wormwood better than the garden southernwood. I find they do not dislike the latter plant when it has been dipped in salt and water."

"June 16th, 1856.—I have bred about twenty specimens of *Talæporia pseudo-bombycella* from pupæ-cases principally collected on the trunks of beeches in the Addington and Wickham woods. Some few were taken on the Dartford fence. Only three were females. This afternoon I accompanied Mr. Stainforth to Kingston-on-Thames. We obtained a boat near the bridge and rowed to a small island, a little higher up the river. It is covered with osiers, and on the margin of the island we cut off some of the heads of the osiers and brought home for the purpose of feeding *Ægeria* [*Sesia formiciformis*, subsequently bred therefrom], Mr. Stainforth having bred several last year. We noticed one or two pupæ in holes, but not any of the perfect insect."

"June 21st.—Went again to-day to the *coryli* locality, having left London at 10 a.m., accompanied by Mr. Francis' son. We first went up Croham lane to the Hurst, and took a considerable number of larvæ and a few moths; one I had never taken before. Near Shirley Common I also took a further quantity of *Cryptocephalus coryli*, &c. From the boys at the lodges I obtained several more moths, some rather good, such as *Polia* [*Aplecta*] *tincta*. Larvæ appear very plentiful this year, particularly Geometræ. I have taken several thorns, prominents, &c. N.B.—The grounds in which I get *C. coryli* is called 'Ballards,' the residence of Hopfman, Esq. The particular locality is a piece of stony ground at the bottom of the hill at the Croydon end of Shirley Common, and surrounded by a larch plantation. The ground is covered on its surface with roundish pebbles, and is overgrown. In addition to the sallows there are young larches, birches, oaks, beeches, nuts, with a profusion of *Epilobium angustifolium* and other plants, including Orchideæ."

"June 24th.—Went down again to Croydon and took several more *coryli* and other *Cryptocephali*. N.B.—Among the moths obtained from the cottagers about this time were the following:—*Notodonta camelina*, *N. chaonia*, *Apatela* [*Acronycta*] *leporina*, probably a specimen of *Semaphora* [*A.*] *tridens*; *Dianthœcia cucubali?*—the purple one; twelve specimens of *Halias prasinana*, since taken by myself also; *Macaria notataria* [*notata*], *M. lituraria* [*liturata*], *Heliothis marginata* [*Chariclea umbra*], and *Abrostola urticæ* [*Habrostola tripartita*], &c."

"July 5th.—Went again to Queenboro' [previous entry July 3rd] and found larvæ of [*Bombyx*] *castrensis* in immense abundance, principally full-fed. Brought away several hundreds. They seem to revel in the moist places overgrown with grass, *Statice*, *Artemisia*, and other salt-marsh plants. They seem to feed freely on *S. limonium;* on that and *A. maritima* they are principally found. They were crawling about in such profusion that in many parts I could scarcely walk without treading upon them. Among the *Artemisia* I brought home there must have been a pupa of *Phorodesma smaragdaria*, as, upon opening the parcel and separating the plants, a crippled and much-injured specimen (female) crawled out. I have set it, although in very bad condition, as I had not the species in my collection."

"July 12th.—My larvæ of [*B.*] *castrensis* are spinning very fast. They eat cherry leaves dipped in salt and water voraciously. I have already from 150 to 200 spun up."

"July 24th.—A man of the name of Page, a gardener who lives at a cottage at the foot of the hill leading to 'Ballards,' has a very fine specimen of [*Vanessa*] *antiopa*, which he took off a tree opposite his house about five years ago. The tree bled very much, and *antiopa* came with many other insects to the sap. My brother has a specimen taken on the Addington hills, I believe about the same time." In a later note it is mentioned that Page sold his *antiopa* to Dr. Knapp, but the price was not stated, although it was known that 30s. had been refused for the specimen some time previous to the sale.

"July 31st.—About fifty *castrensis* have appeared [fifty emerged the previous day], principally females; I have many caterpillars yet feeding." Further entries respecting the rearing of this species show that about sixty emerged on August 2nd, and about thirty on August 3rd, while on the 21st of the month he wrote:—"I expect I shall breed no more *castrensis*, none having appeared the last three or four days. I have set about 340—114 males and 225 females." This stock seems to have been of considerable value in the way of exchange, as appears by the following entry:—

"September 13th.—Turner has called twice upon me within the last few days, and I have bought about 30s. worth of insects from him, and also gave him a dozen *C.* [*B.*] *castrensis*, and exchanged another dozen with him for insects. I have also bought about 12s. worth of insects from Argent in the last few days, and exchanged *castrensis* for others. From him I obtained sixteen *P. arion*, taken by J. Chambers at Stilton, which is near Yaxley in Cambridgeshire [there surely must have been some error here]. Mr. Doubleday also sent me to-day a box of insects, and when I went down there a few weeks ago to take him fifty *castrensis*, he also gave me about fifty good insects in return. The opportunities have added several species to my collection, which I am now rearranging, and have also enabled me to complete my series of many species of which before I had only bad specimens. My own collecting this year has also contributed much to this end."

The following entry, the last in this diary, shows the deep interest the writer took in entomology, and the careful manner in which he made his observations:—

"July 17th, 1860.—I have now been ill above twelve months and am still almost incapable of taking any exertion, but I have not been able to resist capturing a few insects in the garden. They have principally been Hymenoptera and taken within the last three or four days, for the weather has been so bad that we cannot be said to have had any summer. . . . On Friday last, the 13th, I took about fifty insects, among them twelve specimens of *Fœnus assectator*, which I had only once before met with in the garden some years ago. Only one was a female, and that I took on a flower. The others were hovering over some rotten stakes. Whilst watching a black currant bush, I observed a currant-tree *Sphinx* alight on the lower part of a dead branch and walk up it in a semi-spiral line, feeling with its ovipositor, which was fully protruded, first on one side of it and then on the other, so that it examined the branch carefully all round. After walking up in this manner three or four inches, it came to the remains of a little branch which had been cut off nearly close to the main stem, and the pith having decayed was left hollow, into which it immediately inserted its ovipositor, and remained depositing its egg or eggs about a minute, when it flew off." The currant-tree "*Sphinx*" mentioned in the above is, of course, *Sesia tipuliformis*.

Richard South.

THE GALLS OF *CYNIPS KOLLARI*, AND THEIR VARIOUS OCCUPANTS.

By T. R. Billups, F.E.S.

The large, round, brownish yellow galls of *Cynips kollari*, which for some years were known by the name of the "Devonshire gall," through having been first observed in the county of Devon, have been so admirably described by Mr. Fitch, in a paper read before the members of the Essex Field Club, October, 1881, and again by Mr. Cameron, in his late monograph of the 'British Phytophagous Hymenoptera' (Ray Society's Works), that it would be superfluous to say one word more upon the Cynipid or gall-maker, so I purpose confining my remarks to the numerous and varied inhabitants reared by myself from the galls during the years 1890, 1891, 1892. In the 'Entomologist' for 1872, Mr. Fitch records a long list of insects bred by the late Mr. Weston. Many of the species mentioned in that list have occurred with me, but having also reared various others not previously recorded, it may perhaps be of interest to enumerate afresh all the species bred by myself.

The galls were all collected on Weybridge Common and Chobham railway banks, from low stubby bushes, and it is only fair to say that many of them were old galls, or apparently empty ones; hence the variety of lodgers, many of which, outside the inquilines and parasites, had taken possession for pupation, &c.; in all 122 species were bred, belonging to no less than six distinct orders, namely, Hymenoptera, Lepidoptera, Diptera, Coleoptera, Neuroptera, and Arachnoidea. These I purpose to again subdivide into their different families as follows:—First, the maker of the galls, *Cynips kollari*, Htg.; these were numerous. Then the inquilines, or, as Mr. Fitch calls them, true burglars; of these we have no less than six species, *Synergus melanopus*, *pallicornis*, *vulgaris*, and *facialis*, Htg., also *reinhardi*, Mayr; these were in fair numbers, with the exception of the first named, which is considered rare in this country; I had thirteen specimens. Another inquiline, *Ceroptres arator*, Htg., I again succeeded in rearing, having previously bred this species in 1884 (see Proc. Ent. Soc. for that year) from *kollari* galls; Mr. Cameron then thinking I might have reared them from the twig galls of *Andricus noduli*, I was pleased to again obtain this rare species, in all some nine specimens, from the *kollari*, and thus cleared up a doubt of long standing. The Chalcids were very numerous, and amongst these beautiful parasites were the following species:—*Torymus regius*, Nees = *devoniensis*, Parfit, *erucarum*, Ns., *auratus*, *abdominalis*, Fons., and *cyniphidum*, Ratz., this later species being especially plentiful. *Megastigmus* *stigmaticus*, *stigma*, and *dorsalis* of Fab.; of this last species I only succeeded in rearing four specimens, two males and two females. *Mesopolobus fasciventris*, Westw., was also scarce; in all five specimens. *Pteromalus tibialis*, West. (Giraud), *naucus*, Foerst, *dissectus*, Walk. (Giraud), and two very dark species I cannot identify. *Syntomaspis caudatus*, Brischke, *dubius*, Nees, and *pubescens*, Forst., were numerous. *Telenomus phalænarum*, Nees, and *Entedon scianurus*, Rtz., were represented by six specimens of each. *Eupelmus geeri* and *urozonus*, Dalm., were plentiful. *Olinx gallarum*, Boh., three specimens only. *Eulophus lævissimus*, Rtz., and *Lamprolatus splendens*, Walk., were fairly common; but of the beautiful little Chalcid *Platymesopus tibialis*, Walk., I only bred three specimens. *Eurytoma rosæ*, Nees, and *salicis*, Thom., common; as were also *Decatoma biguttata*, Br., and *neeri*, Foerst; this last bringing the number of Chalcids to twenty-nine.

The Aculeate Hymenoptera had the following representatives:—*Trypoxylon figulus*, Lin., thirteen, and *clavicerium*, Lep., five specimens. *Stigmus pendulus*, Panz., and *Passalœcus insignis*, V. de-Lind, were equally balanced in seventeen specimens of each; while of *Crabro tibialis*, Fab., there were eleven, and of *C. clavipes*, Lin., only four. Of *Odynerus gracilis*, Brullé, I reared four specimens, two males and two females; and of *trifasciatus*, Olv., five specimens, all females. The pretty little bee, *Prosopis brevicornis*, Nyl., of which I had seven specimens, bringing the number of the Aculeata up to ten species.

The Ichneumonidæ proper were represented by no less than thirty-seven species:—*Homalus auratus*, L., eleven, *cæruleus*, Degeer, thirteen; while of *Chrysis cyanea*, Lin., there were no less than thirty-one specimens. *Phygadeuon obscuripes*, Tasch., two specimens only; while *vagans* and *labralis*, Gr., were represented by five specimens of each; and, strange to say, the specimens of *vagans* were all males, and of *labralis* all females. *Phæogenes troglodytes* and *Ischio melinus*, Gr., were each represented by six specimens. *Hemiteles bicolorinus*, Gr., and *areator*, Panz., were common; *micator* and *æstivalis*, Gr., were fairly plentiful; while of the beautiful little *imbecillus*, Gr., I only reared three examples. *Hemimachus instabilis*, Forst., and *fasciatus*, Fab., were plentiful; as were also *Pezomachus nigritus* and *rufulus*, Forst., while five specimens of *anthracinus*, Forst., were also reared. The Ophionides were represented by *Limneria femoralis* and *dorsalis*, Gr., of which there were eleven specimens; while of *exareolata*, Ratz., there were five only. Among the Tryphonides were three specimens of *Mesoleius formosus*, Gr., and five of *Exochus podagricus*, Gr., all females. The family of Pimplides having as representatives, *Pimpla calobata*, Gr., four specimens, *brevicornis*, Gr., six, and *nucum*, Ratz., eleven. *Perithous divinator*, Rossi, and *varius*, Gr., were each represented by five specimens, all females; these very beautiful insects being no doubt parasitic upon the sawfly larva, which will be referred to later on. There were also two females and one male of *Glypta incisa*, Gr., and a single female of *Lissonota segmentator*, Fab. I had almost forgotten to mention *Clistopyga increator*, Fab., of which I reared three females and two males; and also four females of *Meniscus impressor*, Gr. Among the Braconidæ were eleven specimens of *Rhogas circumscriptus*, Nees; seven specimens of *Apanteles zygænarum*, Marshall, thirteen of *rubripes*, Hall; fifteen of *Macrocentrus marginator*, Nees, and numbers of *infirmus*, Nees. The Oxyuridæ had no less than seven species to represent them, and were as follows:—*Proctotrypes ater*, Nees, nine specimens, and thirteen of *calcar*, Hal.; while there were seven specimens each of *Megaspilus rufipes* and *Oxylabis bisulca*, Nees; of *Belta dorsalis*, Thom., five specimens were reared; but of *Synacra brachialis*, Nees, I only succeeded in finding one specimen; there were also three specimens of the genus *Aphanogmus*, which have not yet been described. Among the Tenthredinidæ or sawflies were no less than thirteen specimens of *Dineura verna*, Giraud, four of *virididorsata*, Cam., and seven of *Emphytus cinctus*, Klug.

The number of species of Lepidoptera reared were only four, and these only in small numbers:—*Ephippiphora gallicolana*, Zell., was represented by three specimens; *Heusimene fimbriana*, Haw., and *Coccyx splendidulana*, Gn., two specimens of each; and one example only of *C. argyrana*, Hb.

Diptera also showed up poorly in numbers, there being only two species:—*Homalomyia canicularis*, L., being common; and a species of *Cecidomyia* undetermined.

The order of Coleoptera was somewhat better, being represented by fourteen species, namely, *Olibrus æneus*, F., plentiful; *Coccinella bipunctata*, L., and *variabilis*, Ill., several specimens of each; *Cryptophagus cellaris*, Scop., and *Orchestes quercus*, L., numerous; *Telephorus flavilabris*, Fall., and *limbatus*, Thom., six specimens of each; *Dasytes plumbeo-niger*, Goeze, abundant; *Malthodes marginatus*, Lat., eleven specimens; *Anaspis melanopa*, Forst., and *ruficollis*, F., both species plentiful; *Cœliodes quercus*, F., and *Rhinosimus planirostris*, F., eleven specimens of each; and, lastly, *Balaninus brassicæ*, F., five specimens only.

Neuroptera was represented in the Psocidæ by three species only:—*Psocus fasciatus*, Fab., and *Stenopsocus cruciatus*, L., were fairly plentiful; while the very beautiful and fragile *Elipsocus unipunctatus*, Müll., mustered three only.

I now come to the end of my list with the Arachnoidea, of which there were several specimens of two species of spider, which I have been unable to get determined. The subfamily Acari had its representatives in *Damæus geniculatus*, Koch, and *Uropoda vegetans*, Lat., both these species being plentiful; while

Hoplophora contractilis, Clap., was in evidence, but not numerous. Altogether there were 122 distinct species; and I feel quite sure that if the galls had been picked from various localities this list might have been enormously extended. I can only hope that others may perhaps be induced by this brief note to follow up this interesting study of the inhabitants of *kollari* galls, which time will not permit me to do as I could wish.

A CATALOGUE OF THE MACRO-LEPIDOPTERA OF DERBYSHIRE.

By Fred. W. G. Payne.

It appears to me that a fitting preface to a list of Derbyshire Macro-Lepidoptera is to offer some brief observations upon the salient geological features of the district. The shire possesses the distinction of a central English situation. It has a surface of peak and plain in which the alpine predominates over the flat land, for the southern termination of the Pennine chain embraces more than half the area. Kinderscout (2000 ft.), rising from an elevated plateau, dominates other eminences scarcely inferior, and the hills (chiefly carboniferous limestone) gradually decline in height, until the southern plain is reached, the latter being bordered on the south by the river Trent. The higher hill ranges are divided by widely sweeping valleys, the lesser and well-wooded eminences being cloven by rocky ravines. The watershed is almost solely southward, the Dove running down the west boundary, the Erewash over the coalfield on the east border, and the Derwent and its tributary the Wye flowing centrally, the whole, through the Keuper area, discharging into the Trent. On the north-west side of the "divide," however, flows the Goyt. In the north-east are beds of lower red sandstone.

My warmest thanks are due to the following ladies and gentlemen who have placed their lists at my disposal, and have otherwise assisted me:—Miss M. Kimber; Miss E. M. Alderson, who has supplied me with records from the north; Rev. G. A. Smallwood; Mr. Hooke, who has forwarded his notes from the Eckington and Staveley district; Rev. R. H. Fuller, who has sent a list of species met with in the Bakewell district; and Rev. C. F. Thornewill, who has supplied me with notes and observations chiefly from the vicinity of Bakewell. I have also to acknowledge that I have quoted freely from the 'List of the Lepidoptera of Burton-on-Trent and Neighbourhood,' published under the auspices of the Burton-on-Trent Natural History and Archæological Society, and that several of the localities for the Rhopalocera are taken from Newman's 'Natural History of

British Butterflies and Moths.' I am also indebted to Mr. John Hill, a collector for more than a quarter of a century in the vicinity of Little Eaton, and to other entomological friends and acquaintances.

Papilio machaon. Newman says that two specimens were taken near Matlock by Thomas Lighton, but remarks that Mr. John Wolley afterwards explained in 'The Zoologist' that he had turned out many hundreds of this butterfly in the springs of 1843 and 1844, most of them at Matlock.

Aporia cratægi. "A nest of larvæ found by Rev. F. M. Spilsbury, in his garden at Barrow-on-Trent, feeding on apple" (Burton list).

Pieris brassicæ. — *P. rapæ.* — *P. napi.* Common.

Euchloë cardamines. Common everywhere.

Colias hyale. Newman mentions one specimen being taken at Via Gellia. — *C. edusa.* Clover-fields at Repton (W. Garneys). Newton Solney (J. T. Harris). Winshill (G. Baker). Rev. G. A. Smallwood and Mr. Hill also record it. — Var. *helice.* Clover-fields at Repton (W. Garneys).

Gonopteryx rhamni. Seal Wood, Dovedale, Repton Shrubs, and Egginton.

Argynnis selene. Dovedale (J. T. Harris). — *A. euphrosyne.* Repton Shrubs and Seal Wood (E. Brown and J. T. Harris). Bakewell, once (Rev. R. H. Fuller). — *A. adippe.* Rare. Breadsall, Dovedale, Matlock, and Cromford. — *A. paphia.* Rare. Repton Shrubs, Seal Wood, and Ankerchurch.

Melitæa aurinia, Rott.,=*artemis*, Fb. Cromford is mentioned as a locality by Newman.

Vanessa c-album. Breadsall, Calke Abbey, Little Eaton, Repton Shrubs, Seal Wood. Mr. Hooke took one specimen at Handley, autumn, 1893. — *V. polychloros.* Breadsall and Calke Abbey (Newman). Little Eaton (J. Hill). Dovedale (J. T. Harris). Barrow (Rev. G. A. Smallwood). — *V. urticæ.* Common as far north as Bakewell. — *V. io.* Fairly common. — *V. antiopa.* Mr. Hill saw one specimen in 1886 in Little Eaton Park. Once at Milton (W. Garneys). — *V. atalanta.* Common throughout the county. — *V. cardui.* Common.

Pararge egeria. Seal Wood (E. Brown). Repton Shrubs (W. Garneys). Bakewell, once (Rev. R. H. Fuller). — *P. megæra.* By no means common in the south, and Mr. Fuller has only three records of it in the Bakewell district.

Satyrus semele. Rare. Dovedale (J. T. Harris).

Epinephele ianira. Common in the south. — *E. tithonus.* Recorded by Messrs. E. Brown and W. M. Anderson, and Rev. G. A. Smallwood. Mr. Hill has seen one specimen at Allestree. — *E. hyperanthus.* Common in the south-west.

Cænonympha pamphilus. Common.

Thecla w-album. Darley, Repton Shrubs, Calke Abbey, Cubley, Seal Wood. — *T. pruni.* Newman says that Mr. J. R. Hind found this species in a box of insects captured within a few miles of Chesterfield. — *T. quercus.* Repton Shrubs and Seal Wood. — *T. rubi.* Dovedale, common, and Alderwasley.

Polyommatus phlæas. Common south, rarer north.

Lycæna astrarche, Bgstr., = *medon*, Esp. Dovedale, and abundant Monsal Dale and Lathkil Dale. — *L. icarus*, Rott., = *alexis*, Hb. Very common everywhere. — *L. argiolus*. Repton, scarce (W. Garneys). — *L. minima*, Fues., = *alsus*, Fab. Common in the central districts. Middleton Dale (Miss E. M. Alderson). Dovedale (Rev. R. H. Fuller).

Nemeobius lucina. Via Gellia.

Syricthus malvæ, L., = *alveolus*, Hb. Recorded once (Rev. R. H. Fuller).

Nisoniades tages. Common. Bakewell, Dovedale, and Lathkil Dale.

Hesperia thaumas, Hufn., = *linea*, Fb. — *H. sylvanus*. Not uncommon south.

Acherontia atropos. Occasionally throughout the southern half of the county.

Sphinx convolvuli. Common south. — *S. ligustri*. Not uncommon in the south-west.

Deilephila galii. Has been taken at Breadsall by Rev. H. A. Stowell.

Chærocampa celerio. Mr. Hooke informs me he took a specimen of this rare insect in the daytime, at rest, on the shutter of a shop near the Midland railway-station at Eckington. — *C. porcellus*. Recorded by Rev. G. A. Smallwood.—*C. elpenor*. Commonest in the larval state. The imago has been taken by Rev. G. A. Smallwood and Mr. Hill.

Smerinthus ocellatus. Fairly common south. Mr. Hooke records two from the Staveley district. — *S. populi*. Common everywhere.

Macroglossa stellatarum. Common south. Recorded from Middleton Dale by Miss E. M. Alderson, Bakewell by Rev. R. H. Fuller, and Staveley by Mr. Hooke.

Trochilium apiformis, Clerck, = *crabroniformis*, Schiff. Findern. Reported from Bakewell by Rev. R. H. Fuller. — *T. crabroniformis*, Lewin, = *bembeciformis*, Hb. Common south.

Sesia sphegiformis. Repton Shrubs (E. Brown and J. T. Harris). — *S. tipuliformis*. Common south. — *S. asiliformis*, Rott., = *cynipiformis*, Esp. Repton Shrubs (W. Garneys). — *S. culiciformis*. Seal Wood and Repton Shrubs.

Ino statices. Common. — *I. geryon*. Monsal Dale (Rev. C. F. Thornewill and Rev. R. H. Fuller). Middleton Dale (Miss E. M. Alderson).

Zygæna loniceræ. Repton Shrubs. — *Z. filipendulæ*. Common.

Hylophila prasinana. Common in south-west.

Nola cucullatella. Common south.—*N. confusalis*, H.-S., = *cristulalis*, Dup. Repton Shrubs.

Nudaria mundana. Fairly common as far north as Bakewell.

Lithosia lurideola, Zinck., = *complanula*, Bdv. Common south.

Gnophria quadra. One specimen was taken at Little Eaton many years ago, by Mr. J. Eaton.

Deiopeia pulchella. Said to have once occurred at Repton (Entom. xvii. 141).

Euchelia jacobææ. Recorded once (Rev. Fuller).

Nemeophila plantaginis. Common in the central portions of the county.

Arctia caia. Common.

Spilosoma fuliginosa. Common everywhere. — *S. mendica*. Once in

Middleton Dale (Rev. C. F. Thornewill). — *S. lubricipeda.* Common. —*S. menthastri.* Common.

Hepialus humuli. Common. — *H. sylvanus.* Fairly common south, rarer north. — *H. velleda.* Common. — *H. lupulinus.* Common everywhere. — *H. hectus.* Common.

Cossus ligniperda. Common.

Zeuzera pyrina, L., *æsculi*, L. Frequent south.

Porthesia similis, Fues.,=*auriflua*, Fb. Common south.

Leucoma salicis. Findern.

Dasychira pudibunda. Findern (Rev. G. A. Smallwood).

Orgyia antiqua. Common everywhere in the county.

Trichiura cratægi. Not common. Willington.

Pœcilocampa populi. Repton.

Eriogaster lanestris. Willington and Chellaston.

Bombyx rubi. Dovedale (E. Brown). Plentiful in Dovedale (J. T. Harris). Reported from the moors (Rev. R. H. Fuller). — *B. quercus.* Fairly common. Chellaston and Little Eaton.

Odonestis potatoria. Common.

Saturnia pavonia, L.,=*carpini*, Schiff. Recorded by Mr. Hill.

Drepana lacertinaria, L.,=*lacertula*, Schiff. Recorded by Rev. G. A. Smallwood. — *D. falcataria*, L.,=*falcula*, Schiff. Seal Wood.

Cilix glaucata, Scop.,=*spinula*, Schiff. Common throughout the county.

Dicranura bicuspis. Rare. Egginton (E. Brown). — *D. furcula.* Repton and Barrow. — *D. bifida.* Fairly common in south-west. — *D. vinula.* Common south; unrecorded from Bakewell district but common about Staveley.

Pterostoma palpina. Seal Wood, Barrow, and Repton Shrubs.

Lophopteryx camelina. Common.

Notodonta dictæa. Common everywhere. — *N. dictæoides.* Derby and Breadsall. — *N. dromedarius.* Derby and Repton Shrubs. — *N. ziczac.* Seal Wood, Repton, Derby, and Barrow. — *N. chaonia.* Repton Shrubs (G. Baker). — *N. dodonea.* Seal Wood (E. Brown). Repton Shrubs (G. Baker).

Phalera bucephala. Common in the south.

Thyatira derasa. Fairly common south. — *T. batis.* Fairly frequent everywhere.

Asphalia diluta. Ingleby. — *A. flavicornis.* Moderately common everywhere.

(To be continued.)

NOTES AND OBSERVATIONS.

Jumping Beans and Jumping Eggs.—There is a remarkable analogy between the "Jumping Beans" which have suddenly sprung into notoriety, and the "Jumping Eggs" of Table Mountain, Cape Town. The latter curiously-animated objects are the production of an insect, and the saltatory action is similarly produced by the activity of the enclosed embryo. These eggs are perfectly oval, white, and about the size of a small sugar-plum, or the printed o's in "Our Notebook," which heads the first column of 'South Africa.' The shell, or case, though only membranous, is hard enough to rattle when confined in some small box. Some of the eggs given to me in Cape Town had been procured the previous day by a young gentleman, who assured me that they kept up such a racket in a match-box in which he had placed them, that they disturbed his rest, and he got up in the night to remove them to a drawer at the farthest end of his room. It was the strangest sight to watch these tiny eggs rolling and springing or standing on end, and leaping like pith-balls on an electrifying machine. Almost a foot they sometimes jumped, either in height or in distance, and by chance beyond the edge of the table, when they fell to the floor, keeping me busy in picking them up again. It was mail day, and I was deep in my weekly despatches; so at last I allowed one of them to remain on the carpet and jump *ad libitum*, while I consigned the others to their box and resumed my pen. Very soon, however, on glancing down, the miniature egglet—my new and precious curiosity—was not to be seen. At once, yet with the utmost caution, I was on hands and knees searching the carpet long and patiently; and it must have been nearly an hour before I discovered the wandering mite at the farther end of the room. But alas for my despatches, it was then too late to mail them. Fancy having one's entire morning consumed, and business frustrated, by the irrepressible egg of an insect! These eggs are ignorantly supposed to be seeds "growing" on a bush. On a bush it is true they are found, and not infrequently, but enclosed in a sort of tumour, like the oak-gall. The parent insect deposits a single egg in a leaf, where as it grows it produces the swelling. It is only when detached from the bush that the embryo becomes excited and keeps up a perpetual motion, as if it were bewitched. The first I saw were exhibited at one of the meetings of the South African Philosophical Society, by Roland Trimen, Esq., F.L.S., F.E.S., and the author of that splendid work on the 'South African Butterflies.' Mr. Trimen had carefully studied the eggs for several years in succession, but had never succeeded in hatching them. The branches wither and die before the eggs are hatched. But he has examined the larva, which he considers more nearly resembles that of a coleopterous insect than any other. It must be a very large beetle to produce such an egg. The "jumping," he thinks, is produced by an action similar to that of the cheese-maggot, which, by the peculiar flip or catch of head and tail, launches itself a distance of many inches. The shrub on which these very remarkable eggs are deposited is the Taai bush—tough bush, from its unbreakable stems. Mr. Trimen signified his intention of having an entire Taai bush dug up and planted in the Museum Garden, that he might watch the hatching of those provoking little eggs. He does not intend that science is to be baffled by a beetle. When I learn the result of his investigations I shall hope to report it in 'South Africa.'—CATHERINE C. HOPLEY; 42, Haggard Road, Twickenham.

[The above was originally published as a letter to the Editor in 'South Africa,' Dec. 1st, 1894. We are sure that many of our readers would be interested to learn the result of Mr. Trimen's investigations, and hope that Miss Hopley will favour us with any further particulars she may obtain.—ED. ENTOM.]

Insects and the Fertilisation of Medicago.—In a paper entitled "On the Fertilisation of some species of *Medicago*, L., in England" ('Proceedings of the Cambridge Philosophical Society,' vol. viii. pt. iii.) Mr. I. H. Burkill discusses the action of certain insects on the explosive mechanism of the *Medicago* flower and their influence in the work of fertilisation. Lists are given of the various species of insects observed to visit the flowers, and a comparison is made between these and the lists given by Müller, the conclusion drawn therefrom being that "it appears *not unlikely*, as might be expected, that flies take in England the place which other more specialised insects occupy in Germany."

The Cold Autumn of 1894 and its Effects on certain Species of the Genus Vanessa.—Of *V. urticæ* I picked about fifty larvæ, nearly full-grown, off nettles, on Aug. 29th, near Chester, a second brood, no doubt. From Oct. 2nd to 19th twenty-five imagines emerged from the chrysalids; the remainder, with the exception of one, died from the effects of the cold weather. The sombre but interesting pattern on the under side of the wings was a little brighter in some specimens, but all were rather small and dark on the whole; otherwise there was no variation of importance. The survivor emerged on Nov. 4th. The species was fairly common throughout the summer. Of *V. io* I saw about two dozen larvæ, more than half-grown, on Sept. 1st, on nettles, near Chester. On my next visit they had disappeared, except a few shrivelled and dead examples. I saw no imagines throughout the season. *V. atalanta* larvæ and pupæ were abundant on nettles near Chester on Sept. 1st. The pupæ had two, sometimes three, leaves drawn together in the form of a hollow ball, a pupa in each, suspended from the top. None observed in any other position upon the nettles, and one only on the wooden railings close to the nettles. Many of the caterpillars were black, with pale yellowish crescentic marks on each side. I took about a hundred larvæ and pupæ. Some of the larvæ had hung themselves up in preparation for the chrysalis state. First emergence on Sept. 30th; the rest began to die off on Oct. 19th; like *V. urticæ* they were only able to partially escape from the chrysalis, or get clear as cripples. On Oct. 19th I bred forty perfect specimens, all told, chiefly by bringing the survivors indoors. My object in breeding *V. atalanta* was to try and get examples of a form which has been seen in this district, in which the bands are orange-red or pale dull red, instead of the usual scarlet. I only partially succeeded in three specimens, which have pale marginal bands on the lower wings. In one of these the upper outer portions of each right wing are dusted with metallic blue scales. Another has a small black spot in the lower portion of the scarlet band of upper left wing. Only one of the forty specimens had the small white spot which sometimes occurs, irrespective of sex, in a similar position on the scarlet band of each upper wing. Another varietal form I bred has a pale blotch extending across the band in the region of the white spot. It was, however, the under sides that chiefly showed variation. Some are very pale, while others verge on blackness. There is, in some cases, a white blotch or spot on the angular part of the red band. Parenthetically, I wonder how many entomologists have noticed in frequent specimens the figure 8 near the apex of the left wing! On the right wing it becomes a capital E. My experience may be of use in accounting for scarcity of Vanessids last autumn in this and other districts. Individuals fortunate enough to leave the chrysalis would probably seek hybernating quarters at once if they could. It will be interesting to observe their progeny next season from a numerical point of view. In spite of their protection in the larva and pupa state, many of the *V. atalanta* were ichneumoned. The first species of ichneumon, because most abundant, was a midge-like parasite; the second, of which I only discovered one specimen, was a veritable sawfly, the size of a wasp and black, legs black and russet, and with a long lance at the extremity protected by the usual V-shaped sheath.—J. Arkle; Chester.

Chrosis bifasciana = audouinana.—This pretty species seems to be of rare occurrence of late years, at any rate I could only muster three specimens in thirty years, until Burney's sale in January last, when I purchased about thirty-eight specimens, part in the collection and others in duplicate boxes. All of them had evidently been taken at the beginning of the "gilt pin" era, some thirty years ago; the pins were tarnished, and most of the specimens were a little greasy and "verdigrised" about the head and body. Does any one know what the larva feeds on? Stainton says, "amongst oaks."—J. B. Hodgkinson; Ashton-on-Ribble, December, 1894. [This species is said to be not uncommon at Chattenden in Kent.—Ed.]

Cidaria reticulata.—This pretty and very local species, which only occurs in the Lake District near Windermere, seems, as far as we can judge, to be on the quick road to extermination. The larva feeds on the seed-pods of the wild balsam (*Impatiens noli-me-tangere*). The little Tortrix larva, *Penthina postremana*, also depends for its existence on the stems of this plant. The balsam grows in abundance, but the first-named insect seems to be exceedingly local. I have only known of three places where I could find any larvæ, and two of them have some time since been destroyed. The third and last place, where the plant was in luxuriant abundance last year, is now practically a barren wilderness. My wife and I paid a visit to the spot on Oct. 1st, but we found to our disappointment nearly all the plants swept away. In order to make clear what seems to me the probable solution of this state of things I must narrate a fact. A certain insect-hunter in the north of England told some collectors that, before any of them should go and look for *reticulata*, he would pull up every plant. He seems indeed to have fulfilled his wanton threat, for my informant, after spending three days in careful search, found only two larvæ on a small plant which had escaped the hand of the destroyer. I wrote to Mr. Moss, of Windermere, who discovered the species independently two years ago. He tells me that he was unable to visit the place this year during the *reticulata* season, as he was staying away in the north of Scotland, and that he is quite at a loss to account for this sad destruction by any natural means. He writes thus:—"It is indeed lamentable if this beautiful moth is to become extinct, and every possible effort ought to be made to obviate such a catastrophe. Not much seems possible, but it is the duty of all alike to do their best to discourage any individual who would not scruple to ruthlessly destroy the food-plant of a local species for the advancement of his own interest. Such a one is not worthy of the name of entomologist." Let us sincerely hope that it is not too late, and that our worst fears may not be realised.—J. B. HODGKINSON.

FOOD-PLANT OF BOMBYX TRIFOLII.—With regard to the food-plant of *Bombyx trifolii* in this district, which at present appears to be its chief habitat, its larva feeds almost exclusively on *Anthyllis vulneraria*, the kidney-vetch; but it will also eat *Lotus corniculatus* in confinement. Hawthorn and sallow I have found very poor substitutes, as they do not seem to afford sufficient nutriment to enable the larvæ to pupate successfully. They like to spin up, just beneath the surface of the sand, and must be kept slightly damp. As noticed by Messrs. Turner and Prideaux (Entom. xxvii. 316; xxviii. 16), the effects of removing them, or leaving them alone, seem almost equally disastrous under certain conditions. I usually obviate this by slicing the end off the cocoon with a sharp knife; great care, however, must be exercised, to avoid injuring the pupa, which is extremely delicate. Both larva and cocoon possess very strong urticating properties, and I know of no species more easily taken in numbers by "assembling."—H. BICKERTON JONES; 180, Lodge Lane, Liverpool.

WOOD NAPHTHA AS A RELAXING MEDIUM.—As the old-fashioned but still useful laurel-jar and damp-sand methods of relaxing insects have, to a certain extent, given way to the relaxing-tin—with its perforated zinc-bottomed trays lined with thick flannel moistened with water containing a little carbolic acid (Entom. xxv. 119)—so possibly may this latter some day be superseded by a new and better arrangement. Indeed, something in this direction is already before the public. Dr. Knaggs, in the 'Entomologists' Monthly Magazine,' has introduced a process of softening the wings of Lepidoptera, communicated to him by Mr. Clark of Hackney. All that seems to be necessary is to damp the bases of the wings on the under side with wood naphtha (pyroxylic spirit), when, after the spirit has been allowed time—say three or four minutes—to soak into the joints, the wings should be pliable enough to permit of spreading on the setting-board. If, however, they should still be refractory, a further application of naphtha will complete the business. Resetting must be commenced directly the wings begin to soften; and if it is required to alter the position of the antennæ, these may be treated separately and after the wings are fixed. In his account of the *modus operandi*, Dr. Knaggs evidently refers to the treatment of a specimen which had been set. Perhaps in the case of unset or "papered" butterflies it would be permissible to dip the specimens in the naphtha instead of applying the spirit by means of a camel-hair brush; but even if this could be done, and without injury to the insects, the process hardly seems to offer any substantial advantage over the relaxing-tin in dealing with a number of specimens. If, however, we have only a few examples to treat, wood naphtha as a relaxing medium would appear to be handy and useful. —RICHARD SOUTH.

CAPTURES AND FIELD REPORTS.

Variation of Vanessa urticæ in Co. Waterford, Ireland.—I bred several specimens of *V. urticæ* this year, intermediate between var. *connexa*, Butl., and the type. Is this variety rare? And has it been previously noticed in Ireland? I also bred some dwarf examples of the type from half-starved larvæ, one of which measures only 1 in. 3 lin. across the expanded wings. I may remark here that the larvæ of *V. urticæ* were extremely abundant throughout the season in this locality, and possibly more of this variety could have been bred.—L. H. Bonaparte-Wyse; Manor of St. John's, Waterford, Dec. 30th, 1894.

Note on Vanessa c-album.—Hybernated specimens of *V. c-album* were very common near Newport in March and April, 1894.—On June 17th I found four small larvæ feeding on red-currant at Greete, near Tenbury, Shropshire. The first butterfly, which emerged on July 7th, was a female, with pale fulvous under side; and this is the only specimen of the pale variety I have seen this year. On July 14th a male and a female, and on the 20th another female, emerged; these, as well as specimens caught on the wing up to August 6th, had dark under sides. There was nothing particularly noticeable about the autumnal brood, the first specimen of which I saw on September 1st.—W. Edney Cox; Newport, Mon.

Chœrocampa celerio in Lancashire.—I have to report the capture of *Chærocampa celerio*, in fair condition, on Nov. 4th, 1894, at Lancaster, by Mr. John Ralph, a member of the Lancaster Entom. and Nat. Hist. Society, in whose possession the insect is. The insect was captured in a greenhouse at Bath Mill Gardens, and Mr. Ralph had the good fortune to secure one, but very much worn, some twenty years ago, in this locality.—Ed. Willan; 92, Penny Street, Lancaster, Dec. 20th, 1894.

Dragonflies in Surrey.—In the December number of the 'Entomologist' (xxvii. 349) is a very interesting note by Mr. W. J. Lucas of the fifteen species of dragonflies observed by him at the Black Pond, Esher, Surrey. Of these fifteen species three, viz., *Æschna mixta*, *Agrion tenellum*, and *A. pulchellum*, I have hitherto failed to notice at my favourite hunting-ground, the Hut Pond, Wisley, which is only a few miles distant from the Black Pond and in a very similar locality; but probably the last-mentioned species (*pulchellum*) I have overlooked, as I found one which I could not otherwise account for, among some *A. puella* from that pond. Of those species, neither included in my list (E. M. M. vol. xxix. pp. 9 and 141) of the twenty species found at the Hut Pond, nor in Mr. Lucas's record, one, viz., *C. virgo*, I found in abundance at Newark Abbey, Ripley, some two and a half miles from the Hut Pond; so that from this small district of Surrey, not eight miles from point to point, we have now recorded twenty-four species out of our thirty-nine. Can any other district show so rich a record? Of the fifteen other species, six, viz., *L. fulva*, *O. cærulescens*, *S. sanguineum*, *S. flaveolum*, *C. annulatus*, and *L. nympha*, may possibly yet occur in the district; while three, viz., *C. metallica*, *C. arctica*, and *Æ. borealis*, are only to be taken, so far as Great Britain is concerned, in the Highlands; three others, viz., *C. curtisii*, *I. pumilio*, and *E. mercuriale*, are apparently confined to the New Forest, though the last-mentioned has been said to occur both in Cornwall and Scotland, but not recorded; while of the remaining species, one, *Æ. rufescens*, is confined to the Fens; and two, *G.*

vulgatissimus and *L. dubia*, are hardly likely to occur in this district.—C. A. Briggs; Surrey House, Leatherhead, Dec. 17th, 1894.

The Season in North Middlesex.—Compared with my list of observations previously published in this magazine (Entom. xxvii. 146), the record of 1894 is meagre indeed. The magnificent weather in March, closely resembling that of the year preceding, gave promise of a brilliant entomological season; but the miserably cold spell we experienced in May and June, followed by rain in August and fogs in September, effectually disappointed all hope, and species which occurred in some abundance in this district in 1893 have been conspicuous by their absence. I have again to thank Mr. George Wall for a carefully compiled list of his captures at Grim's Dyke. Among them *Asphalia flavicornis*, of those noted by me as new * to the catalogue of Middlesex Lepidoptera collated by Mr. T. D. A. Cockerell (Entom. xxiv. xxv. xxvi.), turns up again, and *Eupithecia pulchellata* with *Hypenodes costæstrigalis* and *Scoparia ambigualis* (quoted somewhat ambiguously, Entom. xxvi. 102) appear to be novelties, so far as the county is concerned. On March 21st *Gonopteryx rhamni* was out, and two days later *V. urticæ*, in very perfect condition, flitted over the sallow bushes on Harrow Weald Common; while I was informed that *P. rapæ* was flying at Eastcote on March 25th. On April 29th *Cænonympha pamphilus*, *Syrichthus malvæ* (swarming in some places), and *Thanaos tages* were common, with (May 7th) *Polyommatus phlæas*. On May 18th I encountered a single perfect female specimen of *Pararge megæra*, the first of its kind that I have netted here for the last fifteen years. The same day I saw *Euchloë cardamines* and *Lycæna icarus*, the former very scarce, and then came the bad weather. *Hesperia sylvanus*, on the L. & N.W. Railway bank, was fairly numerous; other butterflies practically disappeared till September, *V. atalanta* (last seen Oct. 13th) was rather more abundant than usual; "the whites" notably rare. In the following list of the Heterocera I have only enumerated, with a few exceptions, those species which were not included in my last year's list. Rhopalocera (19 species): *Pieris brassicæ*, *P. napi*, *P. rapæ*, *Euchloë cardamines*, *Gonopteryx rhamni*, *Argynnis euphrosyne* (noted in error last year as *selene*), *Vanessa urticæ*, *V. io*, *V. atalanta*, *V. cardui*, *Pararge megæra*, *Epinephele ianira*, *E. tithonus*, *Cænonympha pamphilus*, *Polyommatus phlæas* (May 7th to mid-October), *Lycæna icarus*, *Syrichthus malvæ*, *Thanaos tages*, *Hesperia sylvanus*. The occurrence of *A. paphia* on Stanmore Common, noted by Mr. Rhoades Smith (Entom. xxvii. 272), is welcome as supporting my belief that in 1893 I caught a glimpse of the same species hard by; and I think it may be interesting to those who work in Middlesex to know that reports have reached me of *Lycæna corydon* and *Colias hyale* being taken also in 1893, close to the same locality, though at present I have had no opportunity of assuring myself that the specimens are properly identified. Heterocera—inter alia: *Smerinthus populi*, *Macroglossa stellatarum*, *Arctia caia*, *Spilosoma fuliginosa* (May 15th), *Hepialus hectus*, *Cossus ligniperda* (one at sugar, July 9th), *Cilix glaucata* (April 29th), *Notodonta dictæoides* (two, April 25th, on tree trunks), *Asphalia flavicornis*, *Leucania lithargyria*, *Hydræcia micacea*, *Miana fasciuncula*, *Caradrina alsines*, *Tryphæna comes*, *Pachnobia rubricosa*, *Calymnia diffinis*, *Aplecta nebulosa*, *Hadena dentina*, *Zanclognatha grisealis*, *Pechypogon barbalis*, **Hypenodes costæstrigalis* (July 6th), *Phigalia pedaria*, *Nyssia hispidaria* (one female, Feb. 24th), *Acidalia dimidiata*, *A. virgularia*, *Anisopteryx æscularia*, **Eupithecia pulchellata* (July

3rd), *E. nanata*, *E. abbreviata*, *Anticlea badiata*, *Eucosmia undulata*, *Cidaria fulvata*, *C. dotata*, *Scoparia ambigualis*, *Scopula prunalis*, *Ebulea sambucalis*, *Pionea forficalis*, *Cataclysta lemmata*, *Paraponyx stratiotata*, *Pterophorus monodactylus*, *Aciptalia pentadactyla*, *Alucita hexadactyla* (Aug. 30th), *Crambus pratellus*, *C. culmellus*, *C. hortuellus*, *Ephestia kühniella*. The above are nearly all from Mr. Wall's list. I have included several very common species only because they do not appear in my former notes. *Cheimatobia brumata* is unpleasantly in evidence, the water at Grim's Dyke being literally strewn with the bodies of the males at the time of writing, while in the spring this veritable pest remained with us, the males as late as Feb. 16th, the females Feb. 2nd. Of the absentees—and they are many—*Brephos parthenias*, *Tephrosia biundularia*, and *Cidaria populata*, are the most to be regretted, as their claim to the Middlesex records appears to rest solely on our observations of single specimens in 1893. —H. Rowland-Brown; Oxhey Grove, Harrow Weald, Dec. 16th, 1894.

Notes from Paignton, S. Devon.—A friend and I collect occasionally, mostly as a pleasurable recreation and healthy exercise, in this locality, which, however, is not a very good one, and has been less productive than ever during the past season—a season of rain. Our chief hunting-ground is a small wood and adjoining orchard, situated near the sea. Sallows, in the spring, were only productive on one night, as the bushes are in a very wind-swept situation, and, during the whole period they were in blossom, a bitter north-east wind prevailed, which, with frost, sometimes completely spoiled sport, with the exception mentioned. On that night, from among the multitude of common insects present, we took examples of *Tæniocampa munda*, *T. rubricosa*, *Xylocampa lithorhiza*, &c., and one each of *Oporina croceago* and *Dasycampa rubiginea*, not, however, in the very best condition. *Lycæna argiolus* was abundant in my garden early in the season, and appeared again in August. A moth-trap, also in my garden, produced many common species, including some large *Odontopera bidentata*; also *Pericallia syringaria*, *Numeria pulveraria* (both uncommon here), *Rusina tenebrosa*, *Grammesia trilinea*, *Heliophobus hispidus*, *Noctua festiva*, and others. Sugaring has been very variable, the nights apparently most suitable sometimes being blanks, and the result on the whole not nearly so good as last year. Early in the season *Grammesia trilinea* came in any number; in fact, hardly any other species was to be seen. This is remarkable, as in previous years we have never seen this insect here. Later on, *Agrotis puta* and *Cosmia affinis* were plentiful. *Calligenia miniata*, several by beating, also on the wing at dusk and on the sugar. *Corycia taminata* scarce this year, though it always occurs in the wood; the same applies to *C. temerata*. *Fidonia piniaria*, *Venilia maculata*, and *Angerona prunaria*, plentiful on the wing at dusk. *Heliophobus hispidus* came freely to the sugaring lamp on the higher ground. *Gonophora derasa* we found this year at sugar, though it is not a common species here. *Thyatira batis* we have not seen for two years; before then it used to be fairly abundant. *Acronycta ligustri* was very scarce; we saw one on sugar, but it got lost in the grass. Subsequently I caught another at in-door light, but it was damaged. *Liparis monacha* round sugaring lamp, and off street lamp coming home, where we also took *Ennomos fuscantaria*, *Hydræcia micacea*, and *Himera pennaria* on Nov. 17th—the same species, too, in moth-trap. On the 27th Sept., a cold night, with strong easterly wind (altogether "unlikely" conditions), we tried sugar, and took several *Polia flavicincta* (particularly off thistles), *Agrotis saucia* and *A. suffusa*, and one *Epunda nigra*. *Phlogophora meticulosa* was so numerous on this occasion as to be a regular nuisance. Hoping to meet with *E. nigra* again, we tried next night, but never took a single specimen of any kind. However, the second week in October being remarkably fine, we determined to try again, and had no cause to regret it. The experiment proved a record night; all the common ivy frequenters swarmed at the patches—*Miselia oxyacanthæ*, *Anchocelis pistacina*, *A. rufina*, *Xanthia ferruginea*, *P. meticulosa*, *A. segetum*, *Scopelosoma satellitia*, *Orthosia macilenta*, *O. lota*, and others. *Epunda nigra* was most abundant, and we took nearly forty specimens of it that night in two short rounds. Ivy blossom has been almost a failure, owing, I suppose, to a fearfully wet autumn. *Cidaria psittacata* here and there, but not numerous. I have taken the pupæ of this species at the roots of oaks on this coast. We obtained one pretty insect, of a delicate cream-colour, which I have subsequently been told is *A. pistacina*. Plenty more *E. nigra* could have been captured at ivy, but only in that district near the wood; in no other part of the surrounding country did we see it. A month's almost continual rain then prevented further collecting. Last year *Ephyra orbicularia* occurred in some numbers at Tiverton (Devon). This year my friend has received, from a friend in that town, both *Macaria alternata* and *Eurymene dolobraria*; it is a much better locality than this. The extraordinary abundance of *Amphipyra pyramidea* last year, and its comparative scarcity in former years, is noteworthy. *Triphæna ianthina* has hardly been seen here this season, though generally very common indeed. I caught a pretty *Rumia cratægata*, with a broad brown band along the costal margin instead of the ordinary spots. It may be mentioned that the blooms of *Aralia sieboldii* are as attractive as ivy.—C. M. Mayor; Paignton, Devon, Nov. 1894.

Collecting in Gloucestershire.—The following is a list of Lepidoptera which I have taken in this neighbourhood during 1894. The season has been very disappointing, and seems to have ended little or no better than it began. On the 16th of March, a warm sunny day, I saw a lovely *Grapta c-album*, but failed to catch it, as I had not my net with me. A very fine specimen of *Amphidasys prodromaria* was found at rest on a beech-trunk in the woods; evidently it had just emerged from pupa about a couple of hours before. *Tephrosia crepuscularia* and *T. consonaria* were both common on the tree-trunks, and *Epione advenaria*, *Venilia maculata*, and *Drepana unguicula* were roused up out of the bramble in the same woods. In 1893 I took thirty-five *Demas coryli* in one day, at rest, and in less than a fortnight over fifty; this last year not one was taken, though the woods were thoroughly searched by several people day after day. Amongst other things *Argynnis euphrosyne*, *Thecla rubi*, *Polyommatus adonis*, *P. argiolus*, *Thymele tages*, *Phytometra ænea*, *Eupithecia abbreviata*, and *E. coronata* were taken abundantly. *Melitæa artemis*, *Arge galatea*, *Sesia bombyliformis*, *Anthrocera trifolii* (one perfectly red variety), *Procris statices*, *Drepana hamula*, *Emmelesia albulata*, and *Botys fuscalis*, were all taken in a low watery meadow in the daytime. A day's excursion to the Forest of Dean in May only produced *Polyommatus argiolus*, *Argynnis euphrosyne*, *Melanippe tristata*, *Corycia punctata*, a peculiarly dark variety of *Eubolia plumbaria*, and a few other commoner things, including a number of larvæ from oak. Of *Procris geryon*, usually so plentiful here, a single specimen was found after a long search on the hill-side. *Asthena blomeri* continued in good condition in the beech woods, from the beginning of June to end of July; and *Abraxas ulmata* swarmed by hundreds in the same place. Sugar produced practically nothing the whole summer through except *Grammesia trilinea*, which has not occurred here before. A few *Minoa euphorbiata* were knocked up out of the undergrowth in the woods. *Polyommatus adonis* was taken on May 16th, on the hills, and *Nemeophila plantaginis* was flying briskly in the sunshine over the rough ground. Several *Toxocampa pastinum* were attracted by a light held opposite a quarry, and others were netted flying in the long grass in company with *Rusina tenebrosa*, *Phibalapteryx tersata*, *P. vitalbata*, and *Cidaria pyraliata*. On July 27th I unexpectedly roused two *Boarmia abietaria* from the firs; they were rather worn, and easily caught. At Oakley Wood, Cirencester, on Aug. 7th, a perfect *Geometra papilionaria* was captured by accidentally thrusting the net into some nut bushes, where it must have been hanging to the leaves. Some rather worn *Argynnis paphia* and *A. adippe* were netted, and *Drepana unguicula*, *Strenia clathrata*, and *Asthena blomeri* were beaten from the bushes. At light, for which I simply have a very strong lamp at a window overlooking the garden to serve as a moth-trap, very few things were taken until August, when *Heliophobus popularis* and *Luperina testacea* came in hundreds for about a fortnight, and a few *L. cespitis* were intermixed with them. *Cilix spinula*, *Ennomos canaria*, *E. angularia*, *Crocallis elinguaria*, *Phibalapteryx vitalbata*, *Anchocelis lunosa*, and others were also taken. In November a few *Petasia cassinea* were attracted, and later on, *Pœcilocampa populi*; but after taking five of the latter one warm night, no more were even seen. Ivy bloom has not been at all productive here. Last year almost every head had some welcome visitor. This autumn nothing turned up of note; indeed, one *Xanthia gilvago* and two or three *Cerastis spadicea* were the only insects taken.—C. J. Nash; Standish Vicarage, Stonehouse, Gloucestershire.

Insects at Light during 1894.—Bearing in mind the popularity with which my previous record of "Insects at Light" was fortunate enough to meet, I have again drawn up a list of the season's captures by that method, and am pleased to find the number of Lepidoptera exceeds that of last year by, roughly, fifty or sixty species, which appears as though this were not so inferior a season for entomologists as the majority of correspondents would have us believe; some of these, however, are Micros. As before, I will give two lists, that the respective merits and demerits of lamps and electric light may be fully appreciated, bearing in mind, however, that the latter is situated in the centre of the town, and the other light records are chiefly street-lamps in the outlying districts, though some are at indoor light, and others at lamps in woods. Ipswich is situated on the banks of the Orwell, and so low in a valley, with hills on every side, excepting where the river winds through water-meadows to Stowmarket, that the electric light may be seen on a dark night from these hills, often two, and, sometimes, a white glare in the sky three miles out. How far it is capable of exercising its fatal attraction, of course, I do not know, but, from the almost invariably bad condition of the moths when they do at last reach the light, I think a considerable distance. At electric light I have personally seen or taken the following species this year:—*Sphinx ligustri*, *Smerinthus populi*, *Lithosia lurideola*, *Arctia caia*, *Spilosoma lubricipeda*, *S. menthastri*, *Porthesia similis*, *Bombyx neustria*, *Rumia luteolata*, *Epione apiciaria*, *Selenia bilunaria* and var. *juliaria*, *Odontopera bidentata*, *Cro-*

callis elinguaria, Ennomos alniaria, E. fuscantaria, Himera pennaria, Nyssia hispidaria, Biston hirtaria, Amphidasys strataria, A. betularia and var. *doubledayaria, Hemerophila abruptaria, Boarmia gemmaria, Pseudopterpna pruinata, Ephyra annulata, Acidalia aversata, Timandra amataria, Halia vauaria, Strenia clathrata, Abraxas grossulariata, Ligdia adustata, Hybernia marginaria, H. aurantiaria, Anisopteryx æscularia, Cheimatobia brumata, Eupithecia oblongata, E. vulgata, E. absinthiata, E. rectangulata, Hypsipetes sordidata, Melanippe fluctuata, Coremia ferrugata, C. unidentaria, Phibalapteryx tersata, Cidaria immanata, C. associata, Pelurga comitata, Drepana falcataria, D. binaria* (seen), *Cilix glaucata, Dicranura bifida, D. vinula, Phalera bucephala, Pygæra curtula, Lophopteryx camelina, Notodonta dictæa, N. ziczac, N. chaonia* (one specimen on April 11th and another about May 20th), *Bryophila perla, Acronycta psi, A. megacephala, A. rumicis, Hydrœcia nictitans, H. micacea, Axylia putris, Xylophasia monoglypha, Charæas graminis* (two females), *Luperina testacea, Mamestra sordida, M. brassicæ, M. persicariæ* (which swarmed), *Apamea basilinea, Miana strigilis, Grammesia trigrammica, Caradrina morpheus, C. alsines, C. quadripunctata, Rusina tenebrosa* (seen), *Agrotis puta, A. segetum, A. exclamationis, A. corticea, A. nigricans, A. tritici, A. aquilina, Triphæna ianthina, T. comes, Noctua augur, N. plecta, N. c-nigrum* (not nearly so abundant as last year, though still common), *N. brunnea, N. festiva, N. rubi* (both first and second broods), *N. umbrosa, Tæniocampa gothica, T. incerta, T. stabilis, T. pulverulenta, Pachnobia rubricosa, Anchocelis lunosa, A. litura, Cirrhœdia xerampelina* (one specimen on Sept. 19th), *Dianthœcia capsincola, Polia flavicincta* (seen), *Phlogophora meticulosa, Euplexia lucipara, Hadena trifolii* (abundant), *H. oleracea, H. pisi, Plusia chrysitis, P. gamma, Catocala nupta, Hypena rostralis, Pyralis costalis* (in 1893), *P. farinalis, P. glaucinalis* (commonly), *Cataclysta lemnata, Paraponyx stratiotalis* (commonly), *Botys ruralis, B. urticata, Pionea forficalis, Endotricha flammealis, Phibalocera quercana, Œdematophorus lithodactylus, Pterophorus monodactylus, Alucita hexadactyla.* Several other orders of insects also show a great penchant for the luminary, as the following notes at electric light illustrate. Coleoptera :—*Pterostichus madidus, Harpalus proteus, H. picipennis* (several of each); *Colymbetes fuscus, Agabus striolatus, Dytiscus marginalis* (female, one), *Coccinella bipunctata, Aphodius rufipes, Melolontha vulgaris, Rhizotrogus solstitialis, Serica brunnea.* Hymenoptera :—*Lasius niger, Ophion luteum, O. obscurum* (fairly commonly), together with a few *Athalia rosæ.* Orthoptera was represented by *Periplaneta orientalis*, and Neuroptera by (probably) several species of the Hemerobiidæ. From lamps, both gas and oil, I took *Nola cucullatella* (six in half-an-hour), *Lithosia lurideola, Spilosoma lubricipeda, S. menthastri, Porthesia similis, Pœcilocampa populi* (Nov. 5th), *Rumia luteolata, Selenia bilunaria, Odontopera bidentata, Crocallis elinguaria, Ennomos alniaria, Himera pennaria, Hemerophila abruptaria, Boarmia gemmaria, Acidalia virgularia, A. aversata, Timandra amataria, Halia vauaria, Strenia clathrata, Abraxas grossulariata, Lomaspilis marginata, Hybernia rupicapraria, H. aurantiaria* (Nov. 6th), *H. marginaria, H. defoliaria, Anisopteryx æscularia, Cheimatobia brumata, Oporabia dilutata, Emmelesia affinitata, Eupithecia oblongata, E. succenturiata, E. subfulvata, E. pimpinellata*(?), *E. vulgata, E. absinthiata, E. sobrinata*(?), *E. rectangulata, Melanippe sociata, M. fluctuata, Coremia ferrugata, C. unidentaria, Triphosa dubitata* (hybernated), *Cidaria miata, C. truncata, C. suffumata, C. associata,* *Eubolia cervinaria*, *Anaitis plagiata*, *Chesias spartiata*, *Cilix glaucata*, *Dicranura bifida*, *Phalera bucephala*, *Diloba cæruleocephala*, *Bryophila perla*, *Leucania pallens*, *Hydrœcia nictitans*, *H. micacea*, *Xylophasia monoglypha*, *Luperina testacea*, *L. cespitis* (seen), *Mamestra brassicæ*, *Caradrina morpheus*, *C. alsines*, *C. quadripunctata*, *Rusina tenebrosa* (commonly in woods), *Agrotis puta*, *A. segetum*, *A. exclamationis*, *Triphæna comes*, *Noctua c-nigrum*, *N. festiva*, *N. rubi*, *Tæniocampa gothica*, *T. incerta*, *T. gracilis*, *T. munda*, *T. pulverulenta*. *Orthosia lota*, *Anchocelis pistacina*, *A. lunosa*, *A. litura*, *Scopelosoma satellitia*, *Xanthia fulvago*, *Hadena trifolii*, *H. oleracea*, *H. pisi*, *Xylocampa areola*, *Plusia gamma*, *Amphipyra tragopogonis*, *Mania typica*, *M. maura* (? at light), *Catocala nupta*, *Herminia tarsipennalis*, *Pyralis glaucinalis*, *Herbula cespitalis*, *Pionea forficalis*, *Crambus perlellus*, *C. tristellus*, *Aphomia sociella*, *Tortrix heparana*, *T. corylana*, *Pterophorus monodactylus*, *Leioptilus microdactylus* (?), *Alucita hexadactyla*. Coleoptera:—*Broscus cephalotes* (? at light), *Calathus cisteloides*, *Harpalus ruficornis*, *H. proteus*, *Coccinella bipunctata*, *Aphodius rufipes*, *Serica brunnea*. Hymenoptera:—Many dead *Vespa vulgaris*,—which had probably entered the lamps in order to prey upon the scorched insects already there, and had consequently *not* been attracted by light,—and several *Ophion obscurum*. Various Hemerobiidæ and Trichoptera turned up. Among the *débris* of thousands of *Chironomidæ* and *Calliphoræ* I noted *Syrphus ribesii*, *Eristalis pertinax*, and several *Homalomyia scalaris* in the autumn. Other records are:—One *Eurymene dolobraria*, which I have never seen about here, was taken at electric light. About a dozen *Smerinthus ocellatus* were taken at ditto in the beginning of June. Two nice specimens of *Pericallia syringaria* were secured at light, whilst sugaring on the 31st of June. *Hybernia defoliaria* has been taken from a street-lamp this year, but is considered by no means common hereabouts. *Pterostoma palpina* at electric light this year, and *Zeuzera pyrina* at a lamp in 1893.—Claude Morley; London Road, Ipswich, Nov. 7th, 1894.

SOCIETIES.

Entomological Society of London.—*December 5th*, 1894. Henry John Elwes, Esq., F.L.S., F.Z.S., President, in the chair. Mr. E. Augustus Bowles, M.A., of Myddelton House, Waltham Cross, Herts; Mr. E. C. Cotes, of the Indian Museum, Calcutta; Mr. Wolley-Dod, of Calgary, Alberta, Canada; Mr. Joseph W. Green, of West Lodge, Blackheath, S.E.; Mr. Henry Keeble, of 10, Coleman Street, E.C.; and Mr. Thomas Turner, of Cullompton, Devon, were elected Fellows of the Society. Mr. F. Merrifield exhibited hybrids belonging to the genus *Saturnia*, obtained by Dr. Standfuss, of Zürich, *viz.*, a male and female hybrid from a male of *S. pavonia* and a female of *S. pyri*, to which he had given the name of *S. emiliæ*; also hybrids from what Dr. Standfuss described as "a male of *Callimorpha dominula* var. *persona*" (received from Tuscany) and a typical female of *C. dominula*, to which he had given the name of *C. romanovi*. Mr. Merrifield remarked that the so-called var. *persona* differed entirely from the type of *C. dominula*. Mr. J. W. Tutt exhibited and read notes on specimens of a very small form of *Euchloë*, taken in Shropshire by the Rev. F. B. Newnham, who was of opinion that it was distinct from

E. cardamines. He pointed out that it was much smaller than the latter species, and that the discoidal spot was placed, as in *E. turritis* and *E. gruneri*, at the juncture of the orange and white spaces, and not, as in *E. cardamines*, well within the orange tip. Mr. Tutt also exhibited and read notes on specimens of *Noctua dahlii*, from Cheshire, Essex, Yorkshire, Aberdeenshire, and other counties. The variation in the specimens was said to be partly due to sexual dimorphism, and partly to their geographical distribution. Herr Jacoby read a letter received from Mr. Buxton Forman, one of the Assistant Secretaries of the Post Office, to the effect that the Postal Union had decided to make a rule not to allow natural history specimens to be sent by sample post, which was intended for the transmission of *bona fide* trade patterns or samples of merchandise, and consequently that the forwarding of such specimens at the sample rate would in future be irregular. Lord Walsingham stated that he had had a long correspondence with the Post Office authorities on the subject, and that the late Mr. Raikes, when Postmaster-General, promised him in 1891 that such specimens should, so far as the British Post Office was concerned, be transmitted at the sample rates; and a letter to the same effect, from the late Sir Arthur Blackwood, when Secretary of the Post Office, was published in the Proceedings of the Society for 1891. Mr. C. G. Barrett exhibited, for Mr. A. J. Hodges, a specimen of *Hydrilla palustris*, from Wicken Fen; also specimens of *Caradrina ambigua*, from the Isle of Wight. He remarked that of the latter, one specimen has the hind margin of the right fore wing indented, and the wing broadened as though from an injury to the pupa. In this wing the margins of the large orbicular and reniform stigmata had become so joined that the dividing lines had disappeared, and the stigmata were fused into one irregularly-formed blotch. Mr. McLachlan exhibited, on behalf of Mr. G. F. Wilson, F.R.S., of Weybridge, a "grease-band" which had been tied round trees to prevent the females of *Cheimatobia brumata* from ascending the trunks for the purpose of oviposition; the band was thickly covered with the bodies of the females, together with a few males. Surgeon-Captain Manders exhibited a pair of *Chelura bifasciata*, from the Shan States, and called attention to the "assembling" habits of the male, some hundreds of which were attracted by the numerous females which emerged from the cocoons at sunset. Mr. B. A. Bower exhibited a beautiful variety of *Zygæna lonicerœ*, Esp., having the spots confluent, taken at Chattenden Wood, North Kent, in June last; also a specimen of *Incurvaria tenuicornis*, Stn., taken at Chislehurst, in May, 1893. Mr. H. Goss exhibited, for Mr. F. W. Urich, of Trinidad, a series of males, females, and workers of *Sericomyrmex opacus*, Mayr, a species of fungus-growing and fungus-eating ant. Colonel Swinhoe read a paper entitled "A List of the Lepidoptera of the Khasia Hills, Part III." Mr. C. J. Gahan read a paper entitled "On the Longicorn Coleoptera of the West India Islands." Mr. F. W. Urich communicated a paper entitled "Notes on the fungus-growing and eating habit of *Sericomyrmex opacus*, Mayr." Prof. E. B. Poulton read a paper, by Prof. E. B. Titchener, entitled "An apparent case of Sexual Preference in a male Insect." The Rev. H. S. Gorham communicated a paper entitled "Notes on Herr A. Kuwert's 'Revision der Cleriden-gattung *Omadius*, Lap.'"

January 16*th*, 1895.—*Sixty-second Annual Meeting.*—Henry John Elwes, Esq., F.L.S., President, in the chair. An abstract of the Treasurer's accounts, showing a good balance in the Society's favour, having been read by Mr. W. F. H. Blandford, one of the Auditors, Mr. H. Goss read the Report of the Council. It was then announced that the following gentlemen had been elected as Officers and Council for 1895:—President, Professor Raphael Meldola, F.R.S.; Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Herbert Goss, F.L.S., and the Rev. Canon Fowler, M.A., F.L.S.; Librarian, Mr. George C. Champion, F.Z.S.; and as other Members of the Council, Mr. George T. Bethune-Baker, F.L.S.; Mr. Walter F. H. Blandford, M.A., F.Z.S.; Dr. Frederick A. Dixey, M.A.; Mr. Henry J. Elwes, F.L.S.; Mr. Charles J. Gahan, M.A.; Professor Edward B. Poulton, M.A., F.R.S.; Dr. David Sharp, M.A., F.R.S.; and the Right Hon. Lord Walsingham, LL.D., F.R.S. It was also announced that Professor Meldola, the new President, would appoint Lord Walsingham, Mr. Henry J. Elwes, and Professor Edward B. Poulton, Vice-Presidents for the Session 1895-6. The outgoing President then delivered an interesting address "On the Geographical Distribution of Insects." He remarked that though a great deal had been written of late years on the geographical distribution of plants, mammals, birds, fishes, and reptiles, comparatively little had yet been done by entomologists to show how far the natural divisions of the earth's surface which have been established for other classes were applicable to insects. Perhaps the proportion of known as compared with unknown insects was still too small, and the classification of the known species still too uncertain, to allow anything like the same methods to be applied to insects that had been used for mammals by Dr. Wallace, for birds by Dr. Sclater and Dr. Bowdler-Sharpe, and for plants by Sir Joseph Hooker, Mr. Thistleton Dyer, and Mr. W. B. Hemsley. The President enumerated the genera of the Rhopalocera, and pointed out which of them were characteristic of the various regions and sub-regions into which the world had been divided by the zoologists and botanists above-mentioned. He also exhibited specimens typical of these regions and sub-regions. The President then alluded to the prosperous condition of the Society, and to the increase in its numbers and income. Reference was also made to various Fellows of the Society and other entomologists who had died during the year, special mention being made of Herr H. T. Christoph, Mr. J. Jenner Weir, Dr. F. Buchanan White, Mons. Lucien F. Lethierry, Pastor Wallengren, Dr. Jacob Spånberg, Major-General Carden, Dr. Hearder, and Mr. Wellman. A vote of thanks to the President and other Officers of the Society having been passed, Mr. Elwes, Mr. McLachlan, Mr. H. Goss, and Canon Fowler replied, and the proceedings terminated.—H. Goss & W. W. Fowler, *Hon. Secretaries.*

South London Entomological and Natural History Society.—*November* 22*nd*, 1894.—Mr. E. Step, President, in the chair. Mr. Barrett exhibited, on behalf of Mr. Sydney Webb, a grand series of varieties of *Arctia villica*, L., from one with very few black markings to one almost wholly suffused with black; also, on behalf of Major Still, specimens taken on Dartmoor this year, to show the apparent influence of the extreme humidity in that district, among them being a black example of *Plusia gamma*, L.; a deep-toned *Cidaria siderata*, Hufn., with a green marginal border on the hind wing; a much-suffused black form of *Polyommatus phlœas*, L.; and dark vars. of *Pararge megæra*, L., and *P. egeria*, L. Mr. R. Adkin, on behalf of Mr. R. E. Dillon, a number of Irish Lepidoptera, including *Tæniocampa gothica*, L., var. *gothicina*, H.-S.; a red var. of *T. gracilis*, Fb.; a dark specimen of *Aplecta nebulosa*, Hufn.; and an almost black *Boarmia repandata*, L. Mr. Tutt, a large number of Rhopalocera captured near Aix-les-Bains on August 22nd, including *Leucophasia sinapis*, L., *Colias edusa*, Fb., *C. hyale*, L., *Satyrus arethusa*, W. V., and vars., *S. briseis*, L., with a very fine var., *Erebia æthiops*, Esp., and several of the genera *Argynnis*, *Lycæna*, and *Melitæa*, and read notes on them; also specimens of *Lycæna ægon*, Schiff., and *L. argus*, L., asking if any one could point out satisfactory differentiating characters. A discussion ensued. Mr. Fremlin, a fine specimen of *Chærocampa celerio*, L., captured at the S. Foreland lighthouse on Aug. 12th, 1894. Mr. Mansbridge, two bred series of *Selenia bilunaria*, Esp., from Horsforth and York, including a few *juliaria*, Haw.; one female had only the central band developed. Mr. Moore, *Pieris daplidice*, L., from Blois. Mr. Tutt read a paper entitled "*Zygæna transalpina*, Esp., and its varieties," and exhibited a large number of specimens, one being set to show the curious tufts of feather scales, said to be scent glands, which exist at the anal cavity. Mr. Adkin read a paper entitled "Reflections upon odd Rambles on the Sussex Downs," and exhibited a number of specimens captured near Eastbourne during his holiday there. A discussion ensued on the various habits Rhopalocera have for effectually concealing themselves. Mr. Tutt referred to *Erebia tyndarus*, Esp., which drops down, falls over sideways, and so wriggles on the cow paths of the High Alps, until it reaches some overhanging tuft of grass under which it rests.

December 13th.—Mr. T. W. Hall, F.E.S., Vice-President, in the chair. Mr. Robinson, 54, Boundary Road, N.W., was elected a member. Mr. C. A. Briggs exhibited a much-suffused variety of *Eurrhypara urticata*, L. Mr. Williams, specimens from two long bred series of *Vanessa urticæ*, L., from Leigh. The larvæ were all taken on the same date from one bed of nettles; those of one series were full grown, those of the other small. There was a very distinct and constant racial difference between the two series. Mr. Adkin, many specimens of *Melanippe fluctuata*, L., from various localities, and contributed notes. Mr. W. Mansbridge, a large number of Lepidoptera from the Indian Territory, U.S.A., and read a paper thereon. Mr. W. A. Pearce also exhibited specimens from the States to illustrate Mr. Mansbridge's paper. A discussion ensued upon the migration of *Anosia archippus*, L., and the forms of *Colias eurytheme*, Bdv. Mr. Brooks, of Rotherham, a large number of species from that place, including a long series of *Polia chi*, L., showing almost every conceivable variation, and melanic specimens of *Hybernia defoliaria*, L., *Boarmia repandata*, L., and *Phigalia pedaria*, Fb. Mr. McArthur, specimens of *Coleophora laricella*, Hb., from N. Devon. Mr. Tutt, a large number of *Zygæna medicaginis*, Bdv., from the Alps, and read a paper on that species and its varieties.

January 10*th*, 1895.—Mr. T. W. Hall, Vice-President, in the chair. Mr. Thornhill, Castle Cosy, Ireland, and Mr. Brooks, Grange Hall, Rotherham, were elected members. Mr. C. G. Barrett exhibited a specimen of *Hydrilla palustris*, Hb., from Wicken, and four specimens of *Caradrina ambigua*, Fb., from the Isle of Wight. One of the latter had an indentation in the hind margin of the fore wing, which was perfectly ciliated. The malformation had caused the orbicular and reniform on that side to coalesce. Mr. Tutt stated that the species he had reported as *C. superstes*, Tr., had turned out to be a form of *C. ambigua*, but he was of opinion that some of his Deal captures were *C. superstes*. Mr. W. A. Pearce, a bred specimen of *Acherontia atropos*, L. It was stated that the pupa of this species had no free segments, and was thus unable to work its way through the earth. Mr. Carrington, the sections of wood naturally stained, which had recently been described and figured in 'Science Gossip'; also a series of dendritic crystals on flints from Chatham, Kent, and described their origin and composition. Mr. R. Adkin, bred specimens of *Vanessa urticæ*, L., from, Sutherland, one of which had the central costal and the inner marginal blotch united. Mr. Tutt gave an interesting account of a change in number of spots of a race of *Zygæna trifolii*, Esp., within the last fifteen years. In the discussion which followed, several members gave instances of a small six-spotted *Zygæna* being taken early in June in various localities. Mr. Carrington gave a short summary of the spread and increase of melanism during the last twenty years. Communications were read from Mr. Step, Porscatho, Falmouth, and from Mr. Brooks, Rotherham. Mr. Tutt read a paper on "*Zygæna ochsenheimeri*, Zell., and its varieties," and exhibited a long series in illustration.—H. J. TURNER, *Hon. Rep. Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*November* 19*th*, 1894.—Mr. G. T. Bethune-Baker, Vice-President, in the chair. Exhibits:—Mr. P. W. Abbott, *Sesia sphegiformis* from Wyre Forest; also a short series of *Caradrina ambigua*, the insect taken at Freshwater, Isle of Wight, which has been recorded in error as *C. superstes; Hydrilla palustris* from Wicken, and *Leucania albipuncta* from Freshwater. Mr. R. C. Bradley, Diptera as follows:—*Idioptera pulchella*, Mg., from Sutton, with its semi-apterous female; *Limnobia nigropunctata*, Sch., from Sutton and Wyre Forest; and *Trimicra pilipes* from Tring. Mr. C. Rung, *Erebia æthiops* from Witherslack, &c. Mr. A. H. Martineau, a series of the genus *Vespa;* also a specimen of *Crabro quadrimaculatus*, with an unusual amount of yellow on the abdomen, giving it a quite unusual appearance. Mr. C. J. Wainwright, a box of Hymenoptera, including a specimen of *Bombus derhamellus* with no yellow on the front of the thorax, from Sutton. Mr. H. J. Sands, living *Vanessa c-album*, bred two months before from a brood, some of which remain in the pupal stage now.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*December* 10*th*, 1894.—Mr. S. J. Capper, F.L.S., F.E.S., President, in the chair. Messrs. Harry Jackson, of Bolton, and Rhodes, of Accrington, were elected members of the Society. Mr. Robert Newstead, of the Grosvenor Museum, Chester, gave an almost complete account of the life-history of *Scolytus rugulosus*, Ratz., one of the rarer wood-boring Coleoptera, and gave detailed descriptions of the boring and ova-depositing habits of the insect. The lecture was illustrated by diagrams, specimens, and microscopic preparations, shown with the aid of the oxyhydrogen micro-lantern. Mr. Douglas Walker exhibited specimens of *Scopula decrepitalis* and the rare *Phibalapteryx lapidata*, recently captured by himself in Argyleshire. Mr. Newstead exhibited his new Coccix *Lecanium perforatum*, and other species, through the micro-lantern.—F. N. Pierce, *Hon. Sec.*

Reading Natural History Society.—A specimen exhibition was held, and was well attended, on Thursday evening, Nov. 1st, the specimens, as usual, being largely entomological. Mr. A. Dowsett, F.E.S., President, showed specimens of trap-door spiders and their nests, from Jamaica, and leaf-insects from Tropical America. Local insects taken during the past season were well represented. Mr. W. E. Butler exhibited a nice series of *Bombyx trifolii*, bred by himself, also *Leucoma salicis*, *Sesia ichneumoniformis*, *S. chrysidiformis*, *Bryophila glandifera*, *Aspilates gilvaria*, *Gnophos obscuraria*, *Angerona prunaria*, *Melanargia galatea*, &c.—Fred. W. Leslie, *Hon. Sec.*

RECENT LITERATURE.

Butterflies and Moths (*British*). By W. Furneaux, F.R.G.S., Author of 'The Out-door World, or Young Collector's Handbook.' 8vo, with two Appendices and Index. Pp. 358, 12 Coloured Plates and numerous Illustrations in the text. London: Longmans, Green & Co. 1894.

A great deal of information respecting the structure and life-history of Lepidoptera, together with methods of collecting and management of ova, larvæ, and pupæ, and also of preparing and arranging specimens, is given in the first portion (137 pages). Then follow short accounts of our native Butterflies and Moths, of which all the former are considered, and a selection of the species, representing nearly all the genera, of the latter are referred to. Of the two Appendices, one is styled a "Complete Classified List of British Macro-Lepidoptera"; but it is curious to note, that of the twelve species in this division recorded as British since the publication of the 'Entomologist Synonymic List,' only one is here mentioned. In Appendix II. we have an epitome of work to be done during each month of the year. One or two of the plates are exceedingly good, but the others are too florid. The figures in the text are for the most part well executed.

We are somewhat surprised to find the white spot in the red band on fore wing of *Vanessa atalanta* still referred to as a character of the female. Again, in the remarks on *Ocneria dispar* there is nothing to indicate that the species is not now found in a wild state in this country. Further, *Endromis versicolor* is stated to be "seen occasionally in the birch woods of southern counties," but there is no mention of its occurrence in Scotland! Apart from a few errors such as those adverted to the book seems pretty trustworthy, and may safely be used by any one seeking a popular introduction to the study of our native Lepidoptera.

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EDITORIAL.

We are very pleased to inform our readers that Mr. F. W. Frohawk, who has done much original work in investigating and writing on the early stages of British Rhopalocera, has been good enough to join the 'Entomologist' Reference Committee.

ON THE CAUSES OF VARIATION AND ABERRATION IN THE IMAGO STAGE OF BUTTERFLIES, WITH SUGGESTIONS ON THE ESTABLISHMENT OF NEW SPECIES.

By Dr. M. Standfuss, Lecturer in both Academies at Zürich. Translated by F. A. Dixey, M.A., M.D., Fellow of Wadham College, Oxford.

[Introductory Note by F. Merrifield, F.E.S.

In October of last year Dr. Standfuss kindly sent me a print of a paper of his containing an account of some extremely interesting results obtained by him from the exposure of Lepidoptera in different stages, and especially in the pupal stage, to extreme temperature. Dr. F. A. Dixey has made a careful translation of it, and this, it having been revised and corrected by the author, with the assistance of his friend Dr. Friedrich Ris, of Rheinau, Ct. Zürich, I have much pleasure in submitting for publication in the 'Entomologist.' By those who have read the papers published by me in the 'Transactions' of the Entomological Society of London for the last few years, it will be recognised that the experiments have in many cases been performed by Dr. Standfuss on the same species as those upon which mine have been tried.

Each of us was quite uninformed, until the conclusion of the experiments, of what the other was doing, and the general correspondence of results, where the subjects were the same and the conditions similar, has therefore the effect of independent confirmatory testimony. Some of Dr. Standfuss's results, however, have been obtained with species which were either not tried by me, or not successfully so; and where the species were the same, it will be found that his observations cover many points to which mine did not extend.

As regards my failure to obtain any results from *P. machaon* and *P. podalirius*, it was probably because I had only the winter pupæ to experiment on; and as regards *V. antiopa*, because the pupæ were not fresh enough.

To suit English readers, the degrees according to Fahrenheit's scale have been appended to those of the Centigrade scale used by the author.

In compliance with a suggestion made to me, I append a statement of the papers, dispersed through several volumes of the Entomological Society's Transactions, describing my experiments, as these, taken together with Dr. Standfuss's very comprehensive paper, and the publications of Dorfmeister, Weismann, W. H. Edwards, and Stange, mentioned in Dr. Standfuss's paper, to which should be added the additional observations described in the English edition of Weismann's 'Studies in the Theory of Descent,' by Prof. Meldola (1882), will, I believe, be found to contain nearly all that has been published on the subject. In connection with the phylogeny of some of the principal subjects of the experiments, *viz.*, the Vanessidæ and the Pierinæ, Dr. Dixey's two papers should be referred to—that "On the Phylogenetic Significance of the Wing-markings in certain Genera of the Nymphalidæ," Feb. 5th, 1890 (Trans. Ent. Soc. Lond. for 1891, p. 89); and that "On the Phylogeny of the Pierinæ, as Illustrated by their Wing-markings and Geographical Distribution," Feb. 7th, 1894 (Trans. Ent. Soc. Lond. for 1894, p. 249).

Dorfmeister's work has not, I believe, been translated into English, but there is a rather full statement of his experiments, with observations upon them, in Prof. Eimer's 'Organic Evolution,' translated by Cunningham (Macmillan, 1890).

PAPERS IN ENTOMOLOGICAL SOCIETY'S TRANSACTIONS.

1887, Dec. 7th (Trans. 1888, p. 123).—*Selenia bilunaria* (*illunaria*); forcing eggs and larvæ, several broods in succession.

1888, Dec. 5th (Trans. 1889, p. 79). — *Selenia bilunaria*, *S. tetralunaria* (*illustraria*), and *Ennomos autumnaria* (*alniaria*); forcing and cooling in different stages.

1889, Dec. 4th (Trans. 1891, p. 131).—*S. bilunaria* and *S. tetralunaria*, and *E. autumnaria*; forcing and cooling in egg, and larval, pupal, and imaginal stages; summary of conclusions, especially as to seasonal double-brooded species.

1890, Dec. 3rd (Trans. 1891, p. 155). — *S. tetralunaria, E. autumnaria, Vanessa urticæ;* forcing and cooling, and different effects caused by temperature according to period of pupal stage in which applied; negative results from moisture applied in pupal stages of *S. tetralunaria* and *E. autumnaria;* possible use of temperature experiments on pupæ in tracing evolution of markings on wings.

1891, Dec. 2nd (Trans. 1892, p. 33).—*S. lunaria*, *S. bilunaria*, and *S. tetralunaria*, *Platypteryx falcataria*, *Vanessa urticæ*, *Bombyx quercus* and var. *callunæ*, *Chelonia caia;* negative results with spring emergence of *P. machaon* and *P. podalirius*, *Thais polyxena*, and some other species; negative results as to effect of light on pupæ of *S. tetralunaria* and *Bombyx cynthia*.

1892, Dec. 7th (Trans. 1893, p. 55).—*Pieris napi*, *Vanessa atalanta*, *Chrysophanus phlœas*, *Zonosoma* (*Ephyra*) *punctaria*. [1893, Feb. 22nd, Trans. p. 69, observations by Dr. F. A. Dixey on the phylogenetic significance of the variations produced by difference of temperature on *Vanessa atalanta*.]

1894, March 14th (Trans. 1894, p. 425).—*Pieris napi*, *Pararge egeria*, *Cidaria silaceata*, *Arachnia levana*, *Vanessa polychloros*, *V. atalanta*, *V. c-album*, *V. io*, and *V. antiopa*, with observations (p. 439) by Dr. F. A. Dixey, on the results obtained.]

I have already treated of the present subject, though by a different title, in the 'Manual for Collectors of the European Lepidoptera,' 1891, pp. 107–128. My starting-point was there the divergent forms—varieties and aberrations—considered in themselves; but in the course of the examination of these forms the causes were indicated by means of which these divergences may perhaps have arisen. This was the only method at that time open, since but few positive statements could then, unfortunately, be made as to the causes of the phenomena in question. It was almost entirely a case of hypotheses with a greater or less degree of probability.

We will here adopt the converse method; that is to say, we will devote our chief attention to the causes which have brought about these phenomena; for I am now, in consequence of careful investigations extending over many years, in a position to contribute in a more practical manner to the solution of this question.

There are a very large number of external conditions which have a decided influence on the organic world. Among these are—degrees of temperature and of humidity, amount of light, barometric pressure; I might further mention the chemical influence of food-stuffs and possibly electricity. I shall here confine myself in the main to those classes of factors whose operation I have myself tested (these being, it will be understood, but a small fraction of the whole), and in what follows I shall either completely pass over or merely touch upon the remainder, at the same time warmly commending them to the notice of zoologists, and especially of entomologists, for experiment.

Forms diverging from the normal imaginal aspect may be occasioned by the influence of external conditions on the stage of egg, larva, pupa, or imago; that is to say, on the perfect insect itself, or any one or more of the preliminary stages. Of the cases falling under these different categories we shall naturally discuss only those that have been actually examined.

I. THE EGG.

The only experiments I have made on the egg-stage of Lepidoptera—and these are only partial—have been in reference to the effect upon them of a raised temperature. Eggs of *Arctia fasciata*, Esp., *Dasychira abietis*, Schiff., *Lasiocampa pruni*, L., and *L. pini*, L., which were exposed to a temperature of 34° C. (93° F.) during the process of laying by the female and up to the time of hatching, produced the larvæ in two-thirds or less of the normal time, and there emerged as perfect insects in the same year, *i. e.*, without hybernation of the larva, in the case of *fasciata*, 71 per cent.; of *abietis*, 90 per cent.; of *pruni*, 100 per cent.; and of *pini*, 81 per cent. The larvæ and pupæ of the above broods were kept as far as possible at a mean temperature of 25° C. (77° F.).

The eggs of the same females as those used in the above experiment, which had already been laid at a normal temperature (about 22° C., 72° F.), and were left in this until hatched, afterwards remaining as larvæ and pupæ in the same mean temperature of 25° C. (77° F.), produced a considerably smaller number of perfect insects without hybernation of the larvæ, *viz.*, *A. fasciata*, 23 per cent.; *D. abietis*, 12 per cent.; *L. pruni*, 64 per cent.; *L. pini*, 28 per cent.

The prematurely developed moths of both series showed on comparison with each other no differences of importance, with the exception of three females of *A. fasciata*, whose larvæ and pupæ had, however, been subjected to different biological conditions from the rest of the early-developed specimens. The different percentage in the two cases, of individuals showing divergence in biological peculiarities from the rest of the brood of the same parent-moth, must therefore be undoubtedly considered as dependent on the difference of temperature to which the two series used in the experiment were exposed in the egg-stage. The acceleration of development, that is to say, which the larva had already undergone in the egg, seems in these cases to have transferred its energy to the later stages of growth. It is well known (see 'Insekten-Börse,' Leipzig, April 15th, 1894, pp. 81, 82) that with the shortening of the period of development is associated in very many cases an obviously altered aspect of the perfect insect, affecting both size, form, and colouring, as in *Lasiocampa populifolia*, Esp., compared with var. *æstiva*, Stgr., and *L. pruni*, L., with var. *prunoides*, Beck.

According to the experiments now recorded it would seem that this alteration in aspect of the perfect insect, to judge at least by the number of individuals that show it, must be influenced by the temperature to which these individuals have been exposed in the egg-stage; so that, if any one wishes to rear such specimens, he must, if possible, keep even the egg at a raised temperature. A series of interesting observations might undoubtedly be made by taking the opposite course, by lowering the temperature, that is to say, and so keeping back the eggs. Many years ago I made an experiment of this kind with a large number of eggs of the second brood of *L. pruni*, unfortunately without result, owing to inexperience and lack of sufficient care. With greater attention this experiment might very easily be carried to a successful issue.*

II. THE LARVA.

The only experiments conducted by me with reference to the possible dependence of divergences in the perfect form on larval conditions have been on the influence of temperature, food, and light. In this case also, as regards the first of the three factors, *viz.*, temperature, the experiments consisted entirely in raising it to a height of 25—30° C. (77—86° F.).

(1) *Size.* — The regular, almost invariable, effect was as follows: the more the period of larval feeding was shortened by the raising of the temperature, the better marked was the reduction in size of the imago.

A pair of *L. quercifolia*, of which the male measured 58 and the female 89 millim. across the wings, produced offspring of which, after a sojourn of 70—85 days in the larval, and 12—15 days in the pupal condition, the males measured only 35—37 and the females 36—39 millim. across the wings. *A. fasciata* (male 46, female 48 millim. across) from pupæ collected in the open air, produced three females measuring 36—39 millim. after a larval stage of 68—87 and a pupal of 15—20 days. *Callimorpha dominula*, L., var. *romanovi*, Stgr. ♂ (59 millim.), and var. *persona*, Hb. ♀ (55 millim.), gave rise, after 65—71 days of larval feeding and 14—19 days in the pupal stage, to a form measuring only 35—38 millim. across the wings in more than a dozen examples.

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* Extensive experiments with reference to the influence of temperature —including a very abrupt change of temperature—on the development of the egg of *Bombyx mori*, L., will be found in the Reports of the Caucasian Silkworm-rearing Station at Tiflis (a Government institution) for the year 1891. Unfortunately they are in Russian.

Although in the following experiments no hybernation of the larva occurred, yet, in contrast to the instances just given, individuals of *A. fasciata* were reared from eggs of the same pair as above, after 142—163 days of larval and 25—31 days of pupal existence, which measured 55—57 millim. in expanse; and eggs of *L. pini*, L. (male 59, female 74 millim.), yielded descendants expanding 65—68 millim. in the male and 84—86 millim. in the female after 150—172 days of larval feeding and 25—37 days in the pupal condition. Here, that is to say, notwithstanding the raised temperature, there appeared to be scarcely any curtailment of the normal period of feeding—of course after deduction (in the case of the latter) of the period of hybernation; and this condition led directly to an abnormal increase of size in these individuals. However simple and comprehensible these facts may appear, they are nevertheless worthy of note; inasmuch as these experimental results throw light on the mode of origin of a large number of species. I will here only mention *Argynnis dia*, L., *Lasiocampa tremulifolia*, Hb., *Boarmia consortaria*, F., —all with short larval periods,—compared with *Argynnis amathusia*, Esp., *Lasiocampa populifolia*, Esp., *Boarmia roboraria*, Schiff., with long larval periods. The respective differentiation of these species, which (apart from the well-marked divergence in size) present so extraordinarily close a resemblance to each other both in the imaginal aspect and also to some extent in that of the earlier stages, has probably resulted, according to these experiments, from the fact that in earlier periods of the earth's history their ancestors while in the larval condition did not react in the same manner to changes of temperature. The differences between the pupal stages of *L. tremulifolia* and *B. consortaria* (hybernating as pupæ) on the one hand, and *L. populifolia* and *B. roboraria* (rapidly emerging) on the other, may have arisen as necessary consequences of and divergence in the larval habit at the time of the establishment of the species.

(2) The *form* and *appearance* of the perfect insects derived from these larvæ which have been forced by means of the raised temperature into new biological conditions do not appear to follow any universal laws. Among the species controlled in this respect entirely by the conditions of their life previous to maturity, the most conspicuous differences of this kind are presented by the second and third brood of *Lasiocampa populifolia*, Esp., that is to say, its two varieties, *æstiva*, Stgr., and *autumnalis*, Jaenich, both of which, and especially the latter, show a more deeply indented border to the wings than does the form resulting from hybernated larvæ. It is, however, in those cases in which Nature herself performs the experiments before our eyes by rearing the particular species during both the cooler

and warmer season of the year, that many well-marked differences—as is partly known, partly still unrecognised—present themselves in the shape of the wings. For this purpose the other portions of the body need scarcely be taken into account. These differences, however, show opposite relations in different species; for whereas *Papilio podalirius*, L., *P. machaon*, L., *P. hospiton*, Géné (when it exceptionally produces a second brood), *Polyommatus thersamon*, Esp., *P. phlœas*, L., *Lycæna argiades*, Pallas, and others (see 'Insekten-Börse,' Leipzig, April 15th, 1894) have their summer form provided with longer tails, and in many cases with a more acute fore wing, as well as a more deeply waved border to the hind wing, *Vanessa c-album*, L., and *V. egea*, Cr., show just the opposite; for in these species the summer form presents the less, and the winter form the greater, amount of indentation.

(3) Moreover, with reference to the colours and markings of the wings and of the upper surface of thorax and abdomen (for these latter must also be taken into account) it is not possible to establish any invariable relation between the imago and the larva reared at a raised temperature. *Lasiocampa* var. *æstiva*, Stgr., and var. *autumnalis*, Jaenich, as also *Urapteryx* var. *olivacea*, Stdfs., become darker than the ordinary forms *L. populifolia*, Esp., and *U. sambucaria*, L., derived from hybernated larvæ, by an increase in the dark elements of the pattern. On the other hand, *Dasychira abietis*, Schiff., and *D. pudibunda*, L., have their second brood lighter in consequence of a reduction in the number of dark scales. To adduce a few similar instances from those that occur in nature: *Papilio podalirius*, L., *P. machaon*, L., *Pieris krueperi*, Stgr., *napi*, L., *daplidice*, L., *Anthocharis belemia*, Esp., *belia*, Cr., *Leucophasia sinapis*, L., *Lythria purpuraria*, L., take on, under an increase of warmth, lighter and for the most part cruder and brighter colours. On the other hand, *Polyommatus phlœas*, L., *P. amphidamas*, Esp., *Vanessa levana*, L., become more dusky under the same conditions (see Zeller, 'Isis von Oken,' 1847, p. 213; Weismann, 'Ueber den Saison-Dimorphismus der Schmetterlinge,' Leipzig, 1875; Seitz, Stettin Entom. Zeitschrift, 1894, pp. 290—307; Standfuss, 'Handbuch für Sammler der europäischen Gross-schmetterlinge,' Guben, 1891, pp. 119—125).

Secondly—as to food—I have also recorded, in my 'Manual,' pp. 116—119, all the facts known to me, whether from the careful researches of other trustworthy entomologists, or from my own observations. Here I need only devote a few words to the subject, especially as the experiments, taken together, only yielded results which were actually or virtually negative.

The feeding of polyphagous larvæ on leaves of monkshood (*Aconitum* sp.), walnut (*Juglans* sp.), deadly nightshade (*Atropa belladonna*, L.), the root of the carrot (*Daucus carota*, L.), raw meat, plants kept fresh in water with which acids, alkalies, dye-substances, common salts, Carlsbad salts,—in short, every kind of substance soluble in water,—had been liberally mixed, invariably produced perfect insects which often enough showed a failure in size or general colouring, but in no case any noteworthy variation in tint or pattern.

In the above-quoted Reports of the Caucasian Silkworm-rearing Station at Tiflis (1891—1893), there are many observations on the influence of factors of this nature. According to these, picric acid, eosin, rodin (ammonio-carmine), and indigo are sufficiently assimilated by the larvæ of *Bombyx mori*, L., to lead to a staining of the silk-fibres. There is no mention in these publications of any effect produced on the corresponding perfect insects. The feeding-experiments were performed in the following manner: twigs of mulberry were steeped in the above-named fluids diluted with water; they were then rinsed in fresh water and given as food.

The third point—that of light—may likewise be rapidly passed over with a mere repetition of the statement in my 'Manual,' p. 119. This is as follows:—"Since I was well aware that the development and growth of plants are strongly influenced by differently-coloured rays of light, I had a number of breeding-cages prepared, each of which was provided with a differently-coloured pane of glass; this experiment, however, gave no positive result, although the larvæ were exposed to the influence of the coloured light from the time when they were quite small." Further experiments carried on up to the present time seem to me to prove that violet light leads to an acceleration both of larval growth and of pupal development; but there is no evidence of any visible influence of this experiment upon the colouring or marking of the perfect insect (see G. Schoch, Mittheil. d. Schweitz. Entomol. Gesellsch. 1880, p. 540).

(To be continued.)

MOTH-ADIPOCERE.

By H. Guard Knaggs, M.D., F.L.S.

In broaching this subject let me premise that, owing to causes which will be explained further on, my experiments in the production of moth-adipocere have not been so successful as I could have wished; but nevertheless, and especially taking into consideration the fact that a repetition of the experiments would occupy six months, they are sufficiently so to warrant the placing of the following notes before your readers.

It has often been suggested that moth-grease is of the nature of adipocere, but beyond the fact that both occur after death, there really does not appear to me to be any defined point of similarity. Adipocere is a formation which takes place in dead human and other bodies at a variable time after death. It is generally agreed that it is caused by ammoniacal gases emanating from the nitrogenous portions of the body, such as the organs, muscles, tissues, &c., combining with the hydrocarbons of the fatty portions.

A very interesting account is given in an article devoted to the subject in 'Taylor's Medical Jurisprudence,' edited by Dr. Stevenson, from which it appears that fat bodies are more readily affected than lean ones, and that in cases of drowning the change is comparatively quickly brought about; the most rapid case recorded (which occurred in five weeks) was that of a body found floating on the water. Another case, mentioned by Devergie, was that of a newly-born infant in a cesspool, which became converted into adipocere in six or eight weeks; but Taylor says the usual time taken in a damp grave is three or four years. He mentions a curious case in which the lower part only of a body half immersed in water became adipocere in fourteen months, while the upper portion above water-level was not acted upon, by which, I presume, it decomposed in the ordinary way. In a case recorded in the Phil. Med. Exam., April, 1847, p. 247, the conversion of the whole body was completed in seventeen years, though the various parts could still be identified. So that water, or at any rate moisture, would appear to be a factor generally necessary for the transformation.

Adipocere is, in fact, an ammoniacal and soapy substance, modified by the salts contained in the water in which it has been formed,—first soft, afterwards harder and lighter, and decidedly hard and brittle when dried. It melts at something over 200° F., and when strongly heated gives off ammonia. It is easily suspended in cold water, and with boiling forms an opaque mixture; acids decompose the solution, forming salts. It is partly dissolved by boiling alcohol.

Now moth-grease (as extracted by pure ether) is a fixed oil rather than a fat, semifluid under ordinary temperature, even below freezing-point. It melts between 75° and 80° F. It gives off no ammonia when heated. Neither water nor alcohol, cold or boiling, has any effect upon it beyond contact with the hot liquid making it still more fluid, and acids do not affect it.

Such being the case, it occurred to me to try to produce by the ordinary forces of nature a genuine moth-adipocere, and accordingly I purchased a dozen *Sphinx* pupæ. My first intention was to kill and pin each moth, on its emergence, on to a loaded stage placed under running water, but the effect seemed to be putrefaction and disintegration. I then pinned the remaining pupæ, most of which had dried up, only two or three remaining heavy, upon the stage; placed them in a wide-mouthed pickle-bottle, and turned on the tap to a steady drip. For the first couple of months I threw in a knob of carbonate of ammonia about once a week, and then left them to themselves for another four months. On examining the result, I found that a wretched slaty-black slug had taken to aquatic habits, and had pretty well cleaned out my pupæ. There was, however, a solid unctuous substance representing the head and thorax of one of the specimens, and greatly resembling a piece of real adipocere which Prof. Stewart kindly gave me some time ago. This has been carefully put away as a treasure for future investigation and exhibition—the sole reward of six months' patience!

Folkestone, Jan. 13th, 1895.

DESCRIPTION OF A NEW LOCAL FORM OF *TROIDES VICTORIÆ* (GRAY) FROM BOUGAINVILLE ISLAND, SOLOMON GROUP.

By the Honourable Walter Rothschild, F.Z.S., F.E.S., &c.

I here use the generic term *Troides*, Hübn., because it has priority by about sixteen years of Boisduval's *Ornithoptera*, and because I so use it in my forthcoming revision of the Old World Papilioninæ. To facilitate the student, I include a comparative description of *T. victoriæ* (type) and its subspecies *T. victoriæ reginæ* (Salv. & Godm.).

Typical *T. victoriæ* occurs in Guadalcanar; *T. victoriæ reginæ* in Malaita; and my new form, *T. victoriæ regis*, in Bougainville. I have a male from Alu which stands intermediate between *T. victoriæ* and *T. victoriæ regis*, which proves the latter to be only a subspecies and not a distinct species, as is also *T. victoriæ reginæ*, for I have seen an intermediate.

MALES.

1. *T. victoriæ reginæ*, Salv.—Fore wings: base shining green, stretching more than or about five-sixths into the cell; rest of wing black, with a very large green subapical patch consisting of three large oblong spots between the 3rd costal and upper discoidal nervules, and a small spot behind the first discoidal nervule. In one of the three existing males the patch reaches to the apex, and is joined along the costa by a narrow green streak to the basal area. Hind wing black, with a large green area extending transversely to just beyond the cell and longitudinally to the apex of the cell, within which the green is much clouded with black scales. The discoidal and upper median nervules generally black, but in one specimen powdered with green scales. Between the upper discoidal and middle median nervules there are three

yellow submarginal spots surrounded by green rings. The under side in the two older forms is almost identical.

2. *T. victoriæ regis*, subsp. nov.—Upper wings: the green basal area only occupies two-thirds of the cell; the green subapical patch as long as in *T. victoriæ reginæ* extremest specimen, but consists only of two spots and a small one behind the 5th subcostal nervule, and on the costa the narrow green line only reaches half-way to the basal area. Hind wings with the green area much enlarged, occupying entirely, or almost entirely, the two discoidal and median cellules. On the under side of fore wings the submarginal green spots are much smaller, and the upper ones are not joined to the central green area of the wings. The excised margin at the anal angle is more deeply cut in than in *T. victoriæ reginæ*, forming a much sharper angle.

3. *T. victoriæ*, Gray.—The basal green area extends further into the cell than in *T. victoriæ regis*, but not so far as in *T. victoriæ reginæ*. The subapical green patch is much smaller and shorter, but consists of three distinct spots, of which the posterior one is smallest. The hind wings have the green area extending as far as or farther than in *T. victoriæ regis*.

FEMALES.

1. *T. victoriæ reginæ*, Salv.—Submarginal spots of both pairs of wings very large.

2. *T. victoriæ regis*.—Submarginal spots very small, sometimes almost obliterated; the discal spots and that at the base of the cell of fore wings also smaller than in the two other local forms.

3. *T. victoriæ*, Gray.—Submarginal spots intermediate in size; subapical and basal spots of cell of fore wings mostly separate, but sometimes merged together as in *T. victoriæ reginæ*.

One specimen of a female is recorded by Mr. Salvin in P. Z. S., 1888, p. 118, as being from Florida Island, Solomon Group; this has the submarginal spots almost as small as in *T. victoriæ regis*. It is probably an error of locality, and most likely the specimen was obtained in the Shortland Islands, Solomon Group, and wrongly labelled by the collector.

Tring.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 15.)

Miana strigilis, Clerck.—This species is somewhat local in Ireland, though widely distributed and often exceedingly abundant; varying much, as in Great Britain. I am of opinion that it tends towards topomorphism. In some localities, for instance, most specimens are characterised by forms with broad white or grey outer bands, while in others the greater proportion are of a dingy type, indistinctly marked, with only the lower portion of the band represented. The bright-banded forms much preponderate at Kenmare, Co. Kerry; Renvyle, Connemara; Markree Castle, Co. Sligo; and Drumreaske, Co. Monaghan; while at Howth, and Lambay I. on the Dublin coast, and Shannon Harbour, where the Bog of Allen reaches the Shannon, and Castle Taylor, Co. Galway, obscurely marked forms are chiefly in evidence. It would be desirable to investigate more fully if any special forms affect island or rocky coast localities, and if any local characteristics pertain to the neighbourhood of bogs and moors, as well as the barren limestone regions of Galway and Clare. The classification of variations given in Tutt's 'Variations of Noctuæ,' is based on such minute distinctions that I am unable to follow the arrangement. The difference between "reddish brown," "reddish black," and "blackish brown," when, as we know, they grade insensibly into each other, requires a discrimination which few people possess, and seems an inadequate basis for varietal names. Clerck's type, too, seems to be given as very different from that accepted usually on the Continent, and adopted by Staudinger, Sven Lampa, and others, namely, having blackish fore wings, with a broad white subterminal band. This form, as I have said, is abundant in some Irish localities, and appears somewhat localised.

Ab. *latruncula*, Lang.—Of a lighter hue, reddish, with whitish or brownish outer fascia. This seems the most common Irish form.

Ab. *ærata*, Esp., 146, 4, 5, with coppery ground colour, with distinct reddish fascia, occurs occasionally.

A unicolorous pale sooty brown form (which does not correspond toTutt's *unicolor* "blackish red," nor to Haworth's *latruncula*) is frequent at Howth, as well as ab. *fasciata*, Tutt, the greyish fascia often tending to become obsolete, so making a transitional form to the following.

Ab. *æthiops*, Haw.—Rare in Ireland. Howth; not scarce.

Of the group with greyish ground colour I have only met with two Irish specimens, namely, ab. *præduncula*, Haw., marked with red and black on the central area, Kenmare, Co. Kerry; and ab. *suffuruncula*, Fr. (not Tr., which is referable to *M. literosa*), with a very bright pink central band enclosing the two stigmata, with a slight similar tinge along the outer margin; Markree Castle, Co. Sligo.

MIANA FASCIUNCULA, Haw.—Common in most localities. The ruddy type appears to be somewhat localised, and is not so frequently met with as the muddy grey form named var. *pallida*, Tutt. The pale var. *cana*, Stdgr., with reddish central band, I have never met with in Ireland. The var. *suffusa*, Tutt, an obscure sooty brown to almost black colour, parallel to ab. *æthiops*, of the preceding species, I have frequently taken in many localities. It is not scarce at Howth and Drumcondra, near Dublin; at Drumreaske (occasional), Co. Monaghan; Favour Royal, Tyrone; Armagh (*J.*); and occurs at Shannon Harbour, King's Co.

MIANA LITEROSA, Haw.—A shore species, frequently abundant on the Irish coasts; but very rarely met with inland. It has been taken in the Co. Westmeath, at Killynon (*Miss R.*) and Cromlyn (*Mrs. B.*); Belfast, abundant (*W.*); Portballintrae (*J.*), Co. Antrim; Culmore, near Derry, abundant (*C.*); and on the shores of L. Swilly, at Carrablagh (*G. V. Hart*), and elsewhere; Inver, Co. Donegal; near Sligo; Waterville, Co. Kerry; Minehead and Glandore, Co. Cork; Arklow and Greystones, Co. Wicklow; Killiney (*S.*) and Howth, Co. Dublin; Castle Bellingham, Co. Louth (*Thornhill*).

MIANA BICOLORIA, *Vill.*—Local, and sometimes very abundant on the sea coast. In sparse numbers, where found, in inland localities. Newman was in error in stating it to be so generally distributed in Ireland. I have rarely met with it; and have never seen but one example of the type strongly marked, which was sent me by Mr. Dillon, taken at Clonbrock, with other lighter specimens. It has the basal half of the wing of a deep sepia-brown. At St. John's Point and Clogher Head the type occurs sparsely in very light colouring; and Mr. Thornhill takes it at Castle Bellingham on the same coast, Co. Louth. The most numerous form seems to be the var. *albicans*, Tutt, a pale grey unicolorous insect, which is found very large and fine on the southern shores of Dingle Bay in Kerry; but very small at Kinsale, Arklow, and Kilcool, Co. Wicklow, Howth, and the Louth localities above mentioned. The var. *rufuncula*, Haw., is equally dwarfed, and is usually found at Howth in abundance with the grey form, and on the Louth coast sparingly. It occurs also at Clonbrock, and Killynon (*Miss R.*), Co. Westmeath, rarely. Var. *pulmonaria*, Dup., is not a rare form at St. John's Point and on the Louth coast and Howth. Haworth's *terminalis*, a brownish unicolorous form, is frequent at Clogher Head, and occurs rarely at Howth. It will be seen, therefore, that Irish specimens are generally very dwarfed, and are frequently unicolorous, always faintly marked and coloured. Even where the type occurs it is usually characterised by faded tones.

MIANA ARCUOSA, *Haw.*—Very widely spread, and in some localities abundant. The males vary from a dingy putty colour to white, which appears to be var. *morrisii*, and is not uncommon in Ireland. A more richly-marked form sometimes, but rarely, occurs too; but I have never taken it myself. Localities: Derry and the Giant's Causeway (*C.*); Castle Rock, Co. Antrim, and

Newcastle (*Bw.*); Colin Glen, Belfast, abundant (*W.*); Mount Charles, Donegal; Armagh (*J.*), Drumreaske, Monaghan, and Favour Royal, Tyrone, plentiful; Belleisle and the shores of L. Erne generally, abundant; Farnham, Cavan; Killynon (*Miss R.*) and Cromlyn (*Mrs. B.*), Co. Westmeath; Castle Bellingham (*Thornhill*), Co. Louth; Howth (*G. V. H.*), scarce; Powerscourt, Co. Wicklow (*B.*); Cappagh and near Waterford; along the shores of L. Derg and the Shannon at Scariff, Dromineer, and near Banagher, and common at Clonbrock and elsewhere in Galway.

(To be continued.)

NOTES AND OBSERVATIONS.

Jumping Beans and Jumping Eggs.—Miss Hopley's remarks on "jumping eggs" remind me of my first acquaintance with this phenomenon in the year 1866, having obtained it from the larva of *Tæniocampa stabilis*; this proved to be a parasite, and described by Bridgman in the 'Transactions' of the Entomological Society of London, July, 1882, p. 151, under the name of *Limneria kriechbaumeri.* I have obtained the "jumping egg" many times since then; a description of it and its habits will be found in the 'Entomologist' for 1882, pp. 215, 216. At Plymouth, as the majority of your readers, I have no doubt, are aware, we have a Marine Biological Laboratory, and during the summer season it is used by professors and lecturers from the different colleges for study. About four years since I visited the establishment for the purpose of showing the gentlemen then at work there the actions of the pupa of *L. kriechbaumeri*, and introduced it to them as a "jumping seed." I placed it in the middle of a large newspaper, opened out; it did not move for several seconds, but when it did, I think the first bound was over two feet, and it continued jumping until the students were tired of the performance; they, one and all, admitted that it was most extraordinary, and remarked if they had not seen the action they could not have believed it. The way this curious action is performed is exactly the same as the "hoppers" in old cheese; it brings its head and tail together, and suddenly jerks itself, causing the cocoon to spring sometimes over three feet. But why? For protection. The cocoon,* dropping to the ground, is at once surrounded by many dangers, trodden under foot by some animal, or eaten by birds, if it remained exposed. I have found, by several experiments made with them, that they keep up this jumping action until they suppose they have buried themselves under some fallen leaves or crevice in the ground. When the bounding is obstructed it will commence to roll, and when it can roll no further or jump, it will cease trying; but if again taken out, it will repeat the programme over again until it again finds itself secure. I trust that Mr. Roland Trimen will solve his problem, and that I shall have the pleasure of reading it in the 'Entomologist'; or, if Mr. Trimen would like a specimen of my "jumping seed," I will send it to him with much pleasure (not living). — G. C. BIGNELL; 7, Clarence Place, Stonehouse, Plymouth, Jan. 30th, 1895.

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* The cocoon is figured in the 'Entomologist,' June, 1884, plate 2, fig. 27, suspended. It only remains thus for a short time; the first gust of wind breaks the thread, or, if there is no wind, the larva within gets impatient and by its jumping breaks the silk, when it falls to the ground.

JUMPING MAY-BUDS.—*Apropos de* my old friend Miss Hopley's most interesting note on "Jumping Beans and Jumping Eggs" of Table Mountain, I may remark that we possess a somewhat similar curiosity at home. In the Ent. Mo. Mag. vii. p. 282, I wrote:—"*Jumping May-buds.*—I would advise our readers to gather boughs of 'May' in order to observe the antics of a coleopterous larva which produces the above phenomenon." It is so long ago that I rather mistrust my memory, but I know that I had a particularly early-blossoming hawthorn, and that my greengrocer used to beg a bough every spring in order to be the first to bring "May" to Covent Garden; and I believe that, having brought a branch indoors (a most unlucky thing to do, so I'm told), I was much astonished and amused at the queer tricks performed by the buds which had fallen upon the table.—H. G. KNAGGS; London, Feb. 5th.

LIPARIS SALICIS IN THE LONDON DISTRICT. — Referring to previous remarks regarding the scarcity of *L. salicis* in or near London, I am able to state that I have found it in greater abundance in the London district than in any other locality where I have collected. The larvæ occur freely in most seasons at rest on poplar-trunks in Bedford Park. They were also found in great abundance in 1893 at Harlesden, where I once took the pupæ in astonishing numbers spun up on palings. It was formerly quite a common species at Shepherd's Bush, W.—ALFRED T. MITCHELL; 5, Clayton Terrace, Gunnersbury, W., Jan. 28th, 1895.

VANESSA URTICÆ, VAR. CONNEXA, IN SCOTLAND. — Among several specimens of *V. urticæ* reared in Sutherlandshire last summer and selected on account of variation from the usual form (although the amount of variation in the majority of them is exceedingly small), I have one in which the central black costal patch is united with the black patch on the inner margin by a band so densely covered with black scales as to give the appearance of a black band reaching continuously from the costa to the inner margin of both fore wings. Mr. Bonaparte-Wyse records the rearing of a similar form in Co. Waterford last year (*ante*, p. 57), and he has very kindly sent me his four specimens for comparison with the Scotch example, with which the most strongly marked one agrees very closely, except in the matter of size, the specimen from Sutherland being somewhat the larger; the other three show various gradations, in the least strongly marked of which the connection between the two black blotches is made up of sparsely scattered black scales, and has the appearance of a dark shade. The form, although rare in Britain, has occasionally been met with, and is figured by Newman in his 'British Butterflies' (p. 32); in Japan, however, it appears to be the prevailing form, and is the *Vanessa connexa* of Butler, of which a good illustration is given in a previous volume of this Journal (Entom. xxii. pl. viii. fig. 3). The Scotch example under notice agrees very closely with this figure.—Robert Adkin; Lewisham, February, 1895.

Variation of Vanessa urticæ in Ireland.—A variety of *V. urticæ* intermediate between var. *connexa*, Butl., and the type seems to occur in many localities in Ireland. In 1893, when the species was unusually abundant, I observed specimens of this variety at Westport (Co. Mayo), at Howth, and near Belfast. The two specimens taken at Howth are of a peculiar dull-red colour, with the wings thinly scaled, and so partially translucent.—C. W. Watts; 40, Goldhurst Terrace, N.W.

The Entomological Club.—A meeting of this Club was held at the Holborn Restaurant on Tuesday, Jan. 15th, when members and friends to the number of upwards of forty assembled at the invitation of Mr. G. H. Verrall, who presided. In the course of a short address, in which he referred to the antiquity of the Club, it being the oldest association of entomologists in the kingdom, Mr. Verrall announced the resignation of Mr. South as honorary secretary, on account of his removal from London, and expressed a hope that by the next meeting one of the members would offer his services for the vacant post; he dwelt upon the benefits of social intercourse among entomologists afforded by the Club, and which were offered by no other institution, and suggested that it would be for the consideration of the members whether the time had not arrived when it would be well to fill the three vacancies which at present existed in the membership, having regard to candidates that would worthily uphold the traditions of the Club.

CAPTURES AND FIELD REPORTS.

Notes on the Season 1894.—On comparing the past season with that of 1893, it certainly does not show up well, but on the whole I have not found it so bad as many of your correspondents seem to have done. The early spring months, with *Nyssia hispidaria* so common in Epping Forest and the sallows so productive, certainly gave rise to greater expectations than the next few months realised, but July again was better, and so was the autumn.

The sallows at Epping and Theydon turned up the usual species, with plenty of *Tæniocampa munda* and a fair sprinkling of *T. populeti* ova being obtained from each; but up to the end of May, when I spent a week at Brockenhurst, little success was met with, except with larvæ. Of these the principal were a lot of *Callimorpha dominula* and *Bombyx quercus*, from Deal on Easter Monday; a very few *Trochilium apiformis* and *T. bembiciformis*, near Woodbridge; a dozen *Apamea ophiogramma*, from ribbon-grass in my garden; and the following beaten out during two evenings in Epping Forest, viz., *Pæcilocampa populi* (3), *Nola cucullatella* (abundant), *Phigalia pilosaria* and *Nyssia hispidaria* (both very common), *Scotosia rhamnata*, *Petasia cassinea* (2), and *Amphipyra pyramidea*. Other larvæ taken at Brockenhurst between May 26th and June 2nd, were *Argynnis paphia*, *Vanessa polychloros* (two nests of about 30 each), *Thecla quercus* (common), *Halias quercana* (7, two of which were devoured by *Cosmia trapezina* accidentally introduced into the chip-box coming home), *Psilura monacha* (9), *Trichiura cratægi* (1), *Phigalia pilosaria* and *Nyssia hispidaria* (both common), *Boarmia roboraria* (1), *Petasia cassinea* (3), *Asphalia flavicornis* (2), *A. ridens* (1), *Tæniocampa munda*, *T. miniosa* (very abundant in all stages of growth), *Agriopis aprilina* (6, five of them on treacle), and *Amphipyra pyramidea*. After the very commonest species, *T. miniosa* was perhaps the most plentiful.

Imagines of all kinds were scarce, and at the beginning of the week the outlook was not rosy. Things improved as the week went on, however, and on the whole the result was better than at first expected. The following were taken during the day, night proving a dead failure in all ways:—*Argynnis euphrosyne* (abundant), *A. selene* (just coming out), *Nemeobius lucina* (20 in all), *Gonopteryx rhamni* (common), *Macroglossa fuciformis* (common at Rinefield, and a few in New Copse), *M. bombyliformis* (4, in New Copse), *Macaria liturata*, *Bupalus piniaria* (males abundant—one of them very white—and two females), *Anaitis plagiata* (8), *Platypteryx falcula*, *Hadena dentina*, *Euclidia mi*, and *Phytometra ænea*. Everything was far behind time, many of the usual species such as *Bapta taminata*, *Lithosia aureola*, *Platypteryx lacertula*, *P. hamula*, *P. unguicula*, &c., not turning up at all, and all Geometers were very scarce.

After a week's interval I tried my luck at Hailsham, but although undoubtedly night work had improved, everything was still very backward, and there was generally a great lack of insect life in the woods; in fact, only five species of Macros were really common, viz., *Argynnis selene*, *Pechypogon barbalis*, *Iodis lactearia*, *Asthena candidata*, and *Melanippe montanata*, whilst *Lycæna adonis* was in great form on the downs by Glynde. The following occurred from time to time, more or less commonly:—*Melitæa athalia* (hardly out), *Pyrameis cardui*, *Thecla rubi*, *Anthocharis cardamines*, *Limacodes testudo* (a single female beaten out by Mr. Lowe of Guernsey), *Zygæna trifolii*, *Halias quercana* (two cocoons), *Lithosia mesomella*, *Gnophria rubricollis*, *Arctia villica*, *Eurymene dolobraria*, *Boarmia consortaria*, *Ephyra porata*, *Acidalia subsericata*, *Melanippe hastata*, and *Platypteryx falcula*. Although no beating was done, larvæ of *Trichiura cratægi*, *Eriogaster lanestris*, *Bombyx quercus*, and *Psilura monacha* turned up now and again, the latter on treacle. As regards numbers, treacle was no great success, perhaps forty or fifty moths, all told, being about the average number on the trees per evening. Of this very limited company, the species were fairly numerous, the best of them being *Thyatira derasa*, *Diphthera orion*, *Acronycta leporina*, *A. ligustri*, *Leucania comma*, *Xylophasia hepatica*, *Apamea gemina*, *Grammesia trilinea* (and var. *bilinea*), *Rusina tenebrosa*, *Agrotis suffusa* (a single small specimen), *Noctua festiva*, *Aplecta herbida*, *A. nebulosa* (common), *Hadena adusta*, *H. dentina*, *Gonoptera libatrix*, *Boarmia consortaria*, a single *Melanthia albicillata*, and some more *Agriopis aprilina* larvæ. I was very lucky as regards weather, as, with the exception of several heavy showers, rain kept off all the week.

Larvæ continued to be found during the early part of the month at Chingford; *P. pilosaria* and *N. hispidaria* were still abundant; a few *Cossus ligniperda* in the willows on Chingford Plain; and *Orthosia upsilon* commonly under the loose bark of the same trees; *Halias quercana* came down from oak; seven *Trichiura cratægi* from blackthorn; and *Pseudoterpna cytisaria* on the genista at High Beech; but for the next month I did no collecting at all away from London, and very little there. *Eupithecia* *isogrammata* was common in a garden at Stamford Hill, where it has been breeding for years past on a clematis-covered summer-house; and a few odd things came to light at Crouch End towards the end of July, including *Eupithecia subfulvata* and *Dianthœcia capsincola;* but on July 19th I ran down to Benfleet for *Hesperia lineola.* After taking one in an hour and a half, rain coming on in torrents prevented any further search, but from the specimen I took evidently being just out, I should imagine it was too early, although many were worn three days earlier in 1892.

The following day was spent at Darenth Wood, but the wood itself seemed most strikingly empty. One *Thecla quercus* was seen, *Epinephele hyperanthes* fairly common, a few *Hesperia sylvanus*, &c., but common moths of every kind seemed almost absent. The only thing worth having was a fine fresh *Acronycta leporina*, at rest on a brake—surely very late for the species. The neighbouring lanes, however, were in great contrast with the wood, the hedges, and especially the clematis, being full of Geometers. A large majority of the specimens beaten out were various small Acidalias, the best of them being *A. rusticata;* plenty of other species also turned up, including *Iodis vernaria* (3), *Ligdia adustata*, *Eupithecia isogrammata*, *Melanippe procellata*, *Scotosia rhamnata*, and *Triphæna ianthina* (common).

All this time treacle had been a dead failure; but on July 27th, at Darenth Wood again, it began to look up. Starting from Dartford, I again beat out *Iodis vernaria*, *Ligdia adustata*, *E. isogrammata*, and *S. rhamnata* (the latter fairly common); and in addition, *Acidalia imitaria*, *Strenia clathrata* (abundant in the clover-fields), *Phibalapteryx vitalbata*, *Agrotis nigricans*, *Triphæna interjecta*, and *Platypteryx falcula* in the wood; *Pyrameis cardui* was seen at intervals, with a couple of *Gonopteryx rhamni*, and a number of *Bombyx quercus* males; *Leucoma salicis* was found in a hedge in Dartford; a single *Boarmia abietaria* on a fence on the common; whilst *Angerona prunaria* and *Acidalia emarginata* were netted at dusk. At treacle pretty well everything that came at all came the first round. There was a fair variety, the best being *Leucania lithargyria*, *Caradrina blanda*, *Rusina tenebrosa* (worn), *Agrotis nigricans*, *A. tritici*, and *Orthosia suspecta.* This in itself was not much, but it gave a promise of better things, to be fulfilled in the course of a day or two when, treacling at Hailsham (Aug. 1st and 2nd), moths, mostly common, literally swarmed. The best captures, perhaps, were a grand series of *Cosmia trapezina*, which was by far the commonest moth and in endless variety, and a smaller but equally variable one of *Apamea oculea; Calligenia miniata* and *Halias quercana* occurred singly, the vivid green of the latter when seen in the lamp-light for the first time being rather startling. Other insects to turn up were *Leucania conigera*, *L. lithargyria*, *L. comma*, *Hydrœcia nictitans*, *Miana literosa*, *Caradrina blanda*, *Agrotis suffusa*, *Noctua plecta*, *N. dahlii*, *N. baia*, *Cosmia affinis*, *Amphipyra pyramidea*, *Mania maura*, and a good number of *Hypsipetes elutata* (the only Geometer).

Excessive rain and the condition of the woods prevented any day work, except a morning on the Polegate Downs on Aug. 3rd. There was a high wind, and the only butterflies to brave it were vast numbers of *Satyrus semele;* in all the sheltered hollows *Lycæna corydon* and *Eubolia bipunctata* swarmed, with occasional *Argynnis aglaia* and *Melanippe galiata*, *Hesperia linea* occurring rather locally. On the two previous mornings male *Bombyx quercus* were commonly to be seen on the wing, apparently indifferent to wind and heavy rain.

Just at this time treacle seemed to be attractive in the London district, my cousin Mr. Ogden having a very successful evening at Hale End on Aug. 3rd, taking *Leucania lithargyria*, *Hydrœcia nictitans*, *Caradrina blanda* (8), *Agrotis tritici*, *A. ravida*, *Cosmia affinis*, *Noctua umbrosa*, and *Mania maura;* but from this time it again fell quite flat until mid-September.

August was spent mostly at Whitby, but no regular collecting was done; insects seemed very scarce, and when tried on one or two occasions, treacle failed absolutely. *Charæas graminis* and *Cidaria testata* were seen occasionally on the moors, *Polia chi* on the stone walls, and *Argynnis aglaia* commonly at Heyburn Wyke, but beyond this nothing worth noting.

Just a very few things came to treacle in early September near Woodbridge, including *Hydrœcia nictitans*, *Agrotis suffusa*, *A. puta*, *Noctua c-nigrum* (common), *N. rubi*, and *Catocala nupta.* Larvæ of *Amphidasys betularia*, *Platypteryx hamula*, *Cilix spinula*, and *Acronycta tridens* were beaten, and pupæ of *Nonagria typhæ* obtained from the reeds; whilst a moth-trap which was tried every night only attracted one *Smerinthus populi* (very late), one *Notodonta camelina*, *Aspilates citraria*, *Luperina testacea*, and a few very common things. Three specimens of *Ennomos erosaria*, one of which gave me a nice batch of ova, and a single male *Colias edusa*, complete the Suffolk list.

Lamps proved attractive at Crouch End during the month, *Agrotis ravida* occurring again on Sept. 6th and laying a number of ova; good series of *Anchocelis lunosa* (with red forms) and *Luperina testacea*, four *Hydrœcia micacea* and two *Catocala nupta* are the only others worth mentioning. On the 7th *Lycæna adonis* was well out at Redhill, and a fortnight later (Sept. 20th) a female *Thecla betulæ* was taken near Chingford. At last, just beyond the half-month, treacle began to draw again, and working Winchmore Hill six or seven times between the 17th and 28th practically finished up the season for me. Although not nearly so good as the 1893 autumn treacling, a decent number of species turned up; *Anchocelis pistacina* again took the lead, as last year, but *Phlogophora meticulosa* ran it pretty close, often four or five on a tree together; *Cerastis vaccinii* was hardly out when business stopped me at the end of the month, but *Anchocelis litura* was just in time, and on the last day or two I managed to obtain a short but good series. *A. lunosa* was abundant on the 17th, but dropped off afterwards. *Catocala nupta* turned up one or two each evening, and although not common, I got together a nice little series of *Asphalia diluta.* Other captures were *Scopelosoma satellitia* (common), *Anchocelis rufina*, *Hadena proteus*, *Noctua c-nigrum*, *Xylina rhizolitha*, *Agrotis suffusa*, *Xanthia ferruginea*, *X. cerago*, *X. silago*, *Amphipyra pyramidea*, *Hypena rostralis*, and on the 28th quite a fresh *Xylophasia polyodon.* Little else occurred during the remainder of the year, except *Hypena rostralis* on a lamp at Stamford Hill on Oct. 16th, and an apparently fresh *Plusia gamma* as late as Nov. 10th at Crouch End; but although the year might certainly have been very much better, it might equally have been very much worse; and, on the whole, I do not think I should class 1894 with the worst of entomological seasons.—RUSSELL E. JAMES; 3, Mount View Road, Finsbury Park, N., Jan. 30th, 1895.

LEPIDOPTERA IN THE BLOXWORTH DISTRICT, DORSETSHIRE, IN THE SEASON OF 1894.—Please allow me, though rather late in the day, to add my small testimony to the already abundantly testified peculiarities of the past season. The general character of the year 1894 was wet, cold, and thoroughly ungenial, excepting about a fortnight at the end of June and beginning of July, which was fine, fairly warm and seasonable. Many of the commonest Lepidoptera either made no appearance at all, or required close search to find them. I noticed, however, some few exceptions to this, and in one or two cases species hitherto scarce were abundant. Among the exceptions alluded to, *Tortrix viridana* was excessively abundant in some (fortunately restricted) localities. The larvæ also of *Halias prasinana* were abundant, but not followed by any corresponding plenty of the perfect insect. I did not see a single specimen all the season of *Pontia brassicæ*, and only a very few of *P. rapæ*. *Epinephele ianira* was also very scarce, while *Cænonympha pamphilus* was rather abundant, as also was *Nemeobius lucina*; of this last pretty little butterfly (which occurs here every year in greater or less numbers), I caught three one afternoon with one stroke of my net. Sugaring was tried at various times, but after some repeated trials, when scarcely an insect of any kind appeared, it was relinquished. The following were among the best captures of the season; almost all are Micro-Lepidoptera, the Macros being conspicuous by their absence. I have not thought it worth while to place the following insects in systematic order, but have merely jotted them down as they occur in my notes of the season:—*Phycita abietella* (3), beat from Scotch firs. *Phoxopteryx subarcuana*, abundant. *Bactra lanceolana*, two of the richest golden brown variety I have ever seen. *Phoxopteryx diminutana*, several. *Aciptilia paludum*, very scarce; only two or three. *Aventia flexula*, one; in a gooseberry bush. *Stigmonota coniferana*, one; from Scotch fir. This is the first I have ever taken here. *Emmelesia unifasciata*, one. *Zelleria insignipenella*, two; beat from underwood. *Cleodora cytisella*, abundant (though usually scarce); swept among common bracken; a large proportion necessarily much injured by sweeping among this stiff wiry fern. *Retinia pinicolana*, one; from Scotch fir. *Melanippe unangulata*, several; in some seasons it is fairly abundant. *Chauliodus illigerellus*, abundant. *Amblyptilia cosmodactyla*, one. *Cosmopteryx orichalcella*, very abundant. This is only the second recorded occurrence of the species in Dorsetshire; two years ago (1892) I met with two specimens on July 7th, among herbage in a wood at a considerable elevation, and on a chalk soil; this last year (1894) it occurred abundantly, a long distance from the chalk, among coarse grass in a swampy spot on the heath, from June 13th to July 13th. Almost all were obtained by sweeping, a few only being observed and boxed sitting on grass stems; on some evenings I met with from forty to fifty, and after discarding numbers injured in sweeping there remained about 230 specimens, some—in fact, a fair proportion—being as fine as if bred. Fresh specimens were still appearing, when, on July 13th, I was obliged to give over the search. After consultation with Mr. Eustace Bankes as to the probable time of the appearance of a second brood, I again worked the same spot repeatedly, in August and early in September, but saw no trace of the species. It seems, therefore, doubtful whether it is of double appearance or not. *Elachista gleichenella*, very scarce; in some seasons it is abundant. *Pancalia lewenhoekella*, one. *Elachista paludum*, very scarce. *Eupœcilia geyeriana*, very scarce in its original locality, but more abundant in a fresh locality at a considerable distance, and on a heath-bog—a totally different kind of situation from that in which it had been before found in this district. The larvæ must, probably, in this new spot, have bred on the common lousewort (*Pedicularis sylvatica*), as the marsh lousewort (*Pedicularis palustris*) does not grow anywhere in the neighbourhood. *Phoxopteryx siculana*, rare; only three or four.—(Rev.) O. P. Cambridge; Bloxworth Rectory, Feb. 11th.

Hybernia defoliaria in December.—On Dec. 28th I took two male *Hybernia defoliaria* off Knole Park fences, near Sevenoaks; they exactly represent the two forms figured in Newman.—D. P. Turner; 14, Havelock Road, Tonbridge, Jan. 17th, 1895.

[This species has been occasionally observed in the spring, and in 1891 was taken as late as March 4th (*vide* Entom. xxiv. 99).—Ed.]

Early Appearance of Phigalia pedaria — A specimen of this insect, evidently newly emerged, I obtained at electric light, at 11 p.m. on December 14th, which was very mild and raining. Is not this an exceptionally early emergence? — Claude A. Pyett; 28, Waterloo Road, Ipswich. [This species was observed in November, December, and January, during the winter of 1873–4 (Entom. vii. 91). In 1893 Mr. Reid, of Pitcaple, obtained a female specimen on December 27th (Entom. xxvii. 147). A specimen was taken in 1882 as late as the middle of June (Entom. xx. 110).—Ed.]

Great Abundance of Larvæ of Abraxas grossulariata, 1894.—I could not help noting the immense numbers of these larvæ upon *Euonymus* last autumn. Nearly every plant of any size was infested with them. I noticed that the imago was particularly common last season, even in the high roads, and was found flying in the broad daylight. It would be interesting to know if these larvæ were found in any abundance on currant or gooseberry bushes. I had quite as many larvæ to hybernate as I could manage, or I should have been tempted to secure a large quantity for variety breeding.—A. T. Mitchell; 5, Clayton Terrace, Gunnersbury, W., Jan. 28th, 1895.

Larvæ of Ypsipetes ruberata.—In April last, while searching for pupæ under the loose bark on some railings, I found several small yellowish larvæ enclosed in a loose cocoon in a rather advanced state of pupation—one or two had only just spun up. Quoting from Newman's 'British Moths,' "The caterpillar is described by Mr. Machin as rather hairy, and of a dirty white or greyish colour. Mr. Doubleday informs me that it changes to a shiny black chrysalis in the autumn, and remains in that state through the autumn." The larvæ I found were not hairy, and evidently must have hybernated. Unfortunately, several of the imagines emerged hopeless cripples, and I only succeeded in obtaining one perfect specimen. —A. H. Blake; High Street, Biggleswade.

NOTES FROM FOREIGN PERIODICALS.

Abnormal Emergence of Endromis versicolor.—Out of twenty-seven healthy pupæ obtained last autumn nineteen yielded imagines in April. The remainder of the insects not emerging at the proper time, the pupæ were put out in the garden for the winter. An imago was observed in the breeding-cage on October 11th, and seven others emerged in the next eight days.—(L. Frosch, *Societas Entomologica*, xi. 19, 148, 1894.)

An Attempt to cross Bombyx castrensis and B. alpicola.—Herr Selmons has attempted to obtain a hybrid between *B. castrensis* and *B. alpicola*, but without success. A union was obtained between a female *castrensis* and a male *alpicola*, but only one instance of successful copulation was observed; three eggs only were laid, before the death of the female. On the other hand, seven pairs were seen to copulate when female *alpicola* were placed in the box with male *castrensis*, and four females deposited a large number of eggs, all of which proved unproductive. The other three females died before depositing any ova.—(*Societas Entomologica*, Jan., 1894.)

The Cocoon of the Hessian Fly. — In a note on *Cecidomyia destructor*, Say, M. Fanet remarks:— To suppose that what is known as the "flaxseed" stage of the Hessian fly is simply the naked pupa, is a very singular error. The "flaxseed" is merely the cocoon of the insect and the pupa is inside. The cocoon instead of being silky is formed of a homogeneous material, which at first is soft and transparent, becoming hard and brown on drying. On breaking the cocoon or shell, it is easy to find the cast skin of the larva lying beside the true nymph. Occasionally the larva is dead and dry, having succumbed before undergoing its transformation. Entomologists generally had noticed that the "flaxseed" was devoid of segmental sutures, and had considered it abnormal, but at the same time had looked upon it as a characteristic of the pupa of the Hessian fly.*—(*Ann. Soc. Ent. de la France*, Nov., 1894.)

Sale of the Lethierry Collection of Beetles.—This well-known collection of Coleoptera came under the hammer on the 3rd and 4th of December last. From the few instances reported they do not appear to have reached fancy prices. The families Pedilides, Anthicides, Pyrrhochroides, and Mordellides, comprising 228 species, of which 89 were *Anthicus*, were knocked down to M. Pic for 58 francs (£2 6s. 8d.), an active bidder being M. Abeille de Perrin. At the sale of books which took place the following day, the 'Botanical Magazine' went for 850 francs (£34), and the 'Bulletin de la Soc. Linn. de Paris,' of which there exist only four or five complete sets, brought 150 francs (£6).—(*Le Naturaliste*, 187, p. 285.) W. M.

SOCIETIES.

Entomological Society of London.—*February 6th*, 1895.—Professor Raphael Meldola, F.R.S., President, in the chair. The President announced that he had nominated the Right Hon. Lord Walsingham, F.R.S., Mr. Henry John Elwes, F.L.S., and Professor Edward B. Poulton, F.R.S., Vice-Presidents of the Society for the Session 1895–96. Mr. Charles Nicholson, of 202, Evering Road, Clapton, N.E., was elected a Fellow of the Society. Mr. W. F. H. Blandford made some remarks regarding M. Brongniart's donation to the library of his monograph entitled "Recherches pour servir à l'histoire des Insectes Fossiles des Temps Primaires." Mr. Blandford also called attention to figures of pupæ of species of *Spalgis* (Lycænidæ), in the Journal of the Bombay Natural History Society. A discussion followed, in which Mr. Hampson and Mr. McLachlan took part. Canon Fowler exhibited, on behalf of Mr. C. A. Myers, an unusually fine specimen of *Sphæria robertsi*, growing from the prothorax of an underground larva of an *Hepialus*, supposed to be *H. virescens*, from New Zealand. Mr. McLachlan said that there was a doubt whether the caterpillar should be referred to this species. Mr. Blandford stated that the French Government had set aside a section of the Pasteur Institute at Paris for the study of entomophagous fungi. Professor L. C. Miall and Mr. N. Walker communicated a paper entitled "On the Life-history of *Pericoma canescens* (Psychodidæ)," with an Appendix by Baron Osten-Sacken. Herr Jacoby read a paper entitled "Contributions to our knowledge of African Phytophagous Coleoptera." Dr. D. Sharp remarked that Erichsen began the 'Insekten Deutschlands' some sixteen years ago, and as he was engaged on a classification of the Coleoptera of the world, he included a considerable number of these exotic species in his work. Mr. G. F. Hampson read a paper entitled "Descriptions of new Heterocera from India."—W. W. Fowler, *Hon. Sec.*

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* In England the term "flaxseed," when used by entomologists in connection with *Cecidomyia destructor*, is generally understood to refer to the puparium of that insect; *cf.* Miss Ormerod's observations on the species (Trans. Ent. Soc. Lond. 1887, p. 3), and Mr. Enock on the life-history of the Hessian fly (T. E. S. 1891, pp. 329—365).—Ed.

South London Entomological and Natural History Society.—*January* 24*th*, 1895.—*Annual General Meeting.*—Mr. T. W. Hall, F.E.S., Vice-President, in the chair. The Council's and Treasurer's Reports were read, and the Officers and Council for the year were elected as under:—President, T. W. Hall, F.E.S.; Vice-Presidents, C. G. Barrett, F.E.S., and J. Henderson; Treasurer, R. Adkin, F.E.S.; Librarian, H. J. Turner, F.E.S.; Curator, W. West (Greenwich); Hon. Secretaries, Stanley Edwards, F.L.S. (Corresponding), and Hy. J. Turner, F.E.S. (Report); Council: T. R. Billups, F.E.S.; C. A. Briggs, F.E.S.; J. H. Carpenter; C. Fenn, F.E.S.; F. E. Filer; W. Mansbridge, F.E.S.; and W. A. Pearce. In the absence of Mr. Step, the retiring President, Mr. Hall read the Annual Address.

February 14*th.*—Mr. T. W. Hall, F.E.S., President, in the chair. Mr. W. Furneaux, F.R.G.S., of Omany Road, New Cross, was elected a member. Mr. Peach exhibited a specimen of the genus *Xanthia*, said to be *X. ocellaris*, but which all present considered merely a var. of *X. gilvago;* it was from Wimbledon. Mr. Adkin, *Vanessa urticæ*, L., var. from Sutherland and N. Ireland, and commented upon the similarity of these to the Japanese form called *V. connexa*, Butl. He also exhibited series of *Zygæna filipendulæ* from Sutherland, taken 2000 ft. above the sea. Mr. Williams, series of *A. cardamines*, L., with examples of a form which some authorities term *A. alberti*, and read notes thereon.—Hy. J. Turner, *Hon. Report Secretary.*

Birmingham Entomological Society.—*January* 14*th*, 1895.—Mr. G. H. Kenrick, President, in the chair. Dr. F. A. Dixey, of Oxford, delivered a lecture entitled "The Growth of Mimetic Patterns in Butterflies." He first of all showed, with the aid of lantern slides, what he believed to be the line of development of the Pieridæ, from an original uniformly neutral-coloured ancestor; and then, with the aid of diagrams, showed the probable process of changing from a typical Pierid to one closely mimicking a *Heliconius*, dealing with many of the difficulties of the theory of mimicry, and advancing probable explanations.

February 4th.—Annual Meeting.—Mr. S. T. Bethune-Baker, Vice-President, in the chair. The annual reports of the Council, the Treasurer, and the Librarian, were presented; and the officers for the ensuing year were elected as follows:—President, Mr. G. H. Kenrick, F.E.S.; Vice-President, Mr. S. T. Bethune-Baker, F.L.S., F.E.S.; Treasurer, Mr. R. C. Bradley; Librarian, Mr. A. H. Martineau; Secretary, Mr. Colbran J. Wainwright, 147, Hall Road, Handsworth, Birmingham; and other members of the Council, Messrs. P. W. Abbott and W. Harrison. Mr. P. W. Abbott exhibited *Vanessa polychloros*, bred specimens, one of which was unusually pale, the border showing a good deal of yellow, and several unusual yellow blotches on the disk.—Colbran J. Wainwright, *Hon. Sec.*

Lancashire and Cheshire Entomological Society.—*January 14th, 1895.—Annual Meeting.*—Mr. S. J. Capper, F.L.S., F.E.S., President, in the chair. The election of Officers resulted in the re-election of Mr. Capper, President; Mr. Stott, Treasurer; and Mr. Locke, Librarian. Mr. W. E. Sharp was elected Vice-President, and the Rev. R. Freeman, Dr. Ellis, and Messrs. Jones, Gardner, and Wilding were elected for the Council. Mr. Locke was elected Secretary, but on his declining the office, Mr. Pierce agreed to continue acting *pro tem.* The President, in thanking the members for his re-election, spoke of the prosperous state the Society was in, and alluded to the death of one of the earliest helpers of the Society, Dr. Buchanan White. The balance-sheet showed, for the first time for a number of years, a balance on the right side, there being £1 12s. 1d. in hand. Dr. Forbes, Curator of the Derby Museum, Liverpool, was elected an honorary member of the Society. Mr. J. W. Tutt, of London, read a paper entitled "Some Random Notes on the Romanes Lecture of 1894, entitled 'The Effect of External Influences upon Development,'" in which he criticised the remarks of Professor Weismann on the resting state of insects as exhibited in the phenomena of hybernation and æstivation, and showed the points in which he differed from the Professor. The second part of the paper treated of the colour-variation of insects considered biologically. The President exhibited a number of Scotch *Zygæna exulans* and southern forms of *Polyommatus phlœas*. Mr. Tutt, a number of Zygænas from the Alps and other localities. Mr. Roxburg, *Polia nigrocincta* from the Isle of Man.

February 11th.—The President in the chair. Messrs. D. Walker, Herbert Massey, and Harold Milne were elected members. Dr. H. H. Corbett, of Doncaster, read "Remarks on some Varieties of Noctuina from Doncaster," in which he described a number of local forms occurring at Doncaster, illustrated by specimens, conspicuous among which were a fine series of melanic *Calocampa exoleta*, and a fine variety of *Asphalia flavicornis*, in which the dark transverse lines were very strongly marked. Mr. Mason exhibited a long series of *Caradrina ambigua* from Freshwater, a gynandromorphous specimen of *Argynnis paphia*, and a striking variety of *Agrotis agathina*, having the ground colour rosy. Mr. Sharp, a number of European Silphidæ, calling attention to the forms *brunnea* and *subrotundata* of *Silpha atrata*.—F. N. Pierce & A. B. Jones, *Hon. Secs.*

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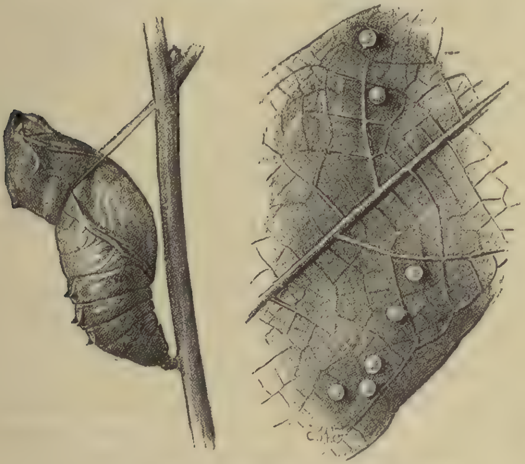
LIFE-HISTORY OF *ORNITHOPTERA RICHMONDII.*

By Henry Schneider.



Pupa and Ova of *Ornithoptera richmondii.*

The caterpillar of *Ornithoptera richmondii* feeds on the *Aristolochia prævenosa,* a tall twiner found in northern New South Wales and southern Queensland. Except where otherwise specified the following description refers exclusively to the full-grown caterpillar:—

Colour usually drab, with a tinge of invisible green varying in different lights. The half-grown caterpillars, and frequently the old ones, are of a richer, deeper tint—a sort of velvety greenish brown.

The body is covered with a number of spines or processes of a soft yielding consistence. Some of them, in future spoken of as spines, are pointed like horns. The bases of these spines are of the same colour as the body. Then, at about the centre of its length, comes a narrow translucent band of yellow, and from thence to the point it is nearly black. Others, to be hereafter designated as caruncles, are much shorter, with a blunt yellow end, or with a black speck on the tip in addition. In other words, they are like the spines, only in a short abortive form. The spines are arranged systematically in three rows on each side of the body as follows:—Firstly, a dorsal row about an eighth of an inch from the centre of the back, and standing up more or less vertically; commencing on the second segment and ending on the twelfth, thus leaving an open space down the centre of the back about a quarter of an inch wide. Secondly, a lateral row of shorter spines, situated just below the spiracles, beginning on the first segment and ending on the eleventh; this row inclines slightly downward. The first, second, and third segments also carry a long spine each, intermediate in position between these two rows; and the fourth segment a short spine, or sometimes only a caruncle, in the same line and just above the spiracle.

When extended in forward motion the length of a full-grown caterpillar is from 2½ to 2¾ inches; but when at rest after a full meal, the anterior segments are bunched up together and the length averages about two inches. I cannot detect any odour, either from the body or from the greenish yellow horns when extruded.

The head is of a rich hazel-brown, or blackish and polished. The lateral jaws are very powerful, and as each mouthful is clipped out of the harsh leaf of the *Aristolochia*, a distinct "click" can be heard. The following detailed description applies, as above stated, to a full-grown caterpillar only:—

The first segment, behind the head, carries a pair of legs. Close above the leg is a short spine, the commencement of the lateral row. Above that again is a long spine projecting laterally, the commencement of the intermediate row of four. Immediately behind and above this spine, and in the crease between the first and second segments, is a depression or foramen. On the top of the back, and reaching from spine to spine, is a crescent-shaped, polished shield of the same colour as the head, in front of which, and close behind the head, is a yellowish lateral stripe, from which can be projected at will two greenish yellow fleshy horns about three-sixteenths of an inch high, cylindrical, truncated, curving slightly backwards, connected at the base, and diverging outwards so as to form an internal angle of sixty degrees.

The second and third segments have each a pair of legs. Above them a pair of yellow-tipped caruncles. Above again, a pair of short lateral spines inclined downward. Above again, a pair of long spines (about three-sixteenths of an inch) inclined upward, forward, and outward. Lastly, the uppermost or dorsal pair of spines nearly vertical. Height about an eighth of an inch.

Fourth segment.—A pair of yellow caruncles in place of legs. Above these another pair of yellow caruncles. Above again, the lateral spines. Then a pair of spiracles. Above them another pair of short spines, the last of the intermediate row. Lastly, the dorsal spines nearly vertical.

Fifth segment.—Pair of yellow caruncles in place of legs. Above them another pair. Again above, the lateral spines. Then spiracles, and lastly the dorsal spines, inclined a little outwards.

Sixth segment.—Pair of claspers. Two pairs of caruncles, one above another. Spiracles. Dorsal spines inclined slightly outwards.

Seventh segment.—Pair of claspers. Pair of yellow caruncles immediately above claspers. A little higher and to the front of claspers, the lateral spines. Spiracles. Dorsal spines inclining a little outward. N.B.—In this pair of spines the band of yellow is broader than in any of the others.

Eighth segment.—Same as seventh, except as to colour of dorsal spines.

Ninth segment.—Same as eighth.

Tenth segment.—Lateral spines. Last pair of spiracles. Dorsal spines, with increased outward and slightly backward incline.

Eleventh segment.—Pair of lateral spines, and dorsal pair inclining outward and backward.

Twelfth segment.—A single pair of spines belonging to the dorsal row, a quarter-inch long, projecting laterally, with slight upward and strong backward incline. Below these is the anal aperture, with a yellow caruncle on each side, and the last pair of claspers below.

The egg, when recently laid, is of a pale ochre-colour, and as the time approaches for the young caterpillar to emerge, changes to a muddy brownish yellow. It is deposited on the under side of the leaf, and is so soft when laid that it flattens against it, and is very firmly glued on. When first the young caterpillars leave the egg they are of a brownish claret-colour, with the head black. All the spines, with the exception of the dorsal pair on the seventh segment, which are yellow at the base, are of the colour of the body for the first half of their length ; the remaining half is black and covered with fine transverse spines branching in every direction. When about a third of an inch long they change their skin, the transverse spines disappear, and the dorsal pair of spines on the seventh segment are a bright yellow for nearly the whole of their length. The yellow bands on the other spines do not make their appearance till later. Up to the time when the caterpillars are an inch or more in length, this pair of yellow spines is a conspicuous feature. It is remarkable that the pair of fleshy horns that can be extruded behind the head are proportionately very much longer in the young caterpillars.

When preparing for the chrysalis stage, the caterpillar first secures the leaf to the twig on which it grows with a quantity of brown silk. Next it spreads a patch of the same material on the leaf below, in order to give a secure hold to its hind claspers. Then having placed itself in position with its tail on this patch, it proceeds to fix a thread to the leaf on one side of its body; then letting go with its legs and also the first pair of claspers, it rears itself up at right angles to the leaf, and throwing its head back, it protrudes the second and third pairs of legs; then passing its head across to the other side, it lodges the thread between the first and second pair of legs, and as the head descends again to the leaf on the other side, the disengaged portion of its body is bulged out in the opposite direction, carrying the thread with it. When the head reaches the leaf, the thread is glued either to the spot from which it started, or a little to one side of it. The thread having been made fast, the head is gradually raised again, and the whole manœuvre gone through in the opposite direction. The new thread is guided by one or other of the first pair of legs and so kept parallel with and touching the loop just made. This process is repeated backwards and forwards, the loop being kept taut all the time by the bulging of the body, until it is sufficiently strong. When complete the head is pushed under the slack loop, which is gradually worked backward until it is arranged to lie in the groove between the fifth and sixth segments, counting from the head. In about twenty-four hours' time he lets go with everything except the hind claspers, and lies back in the loop. About the third day the skin is ready for sloughing. When this operation has begun, if the caterpillar be attentively watched, it will be seen that every half-minute or so he gives a slight upward jerk of the head, followed by an undulating movement passing down the body to the tail. After this has gone on for about a couple of hours, it will be noticeable that the skin, especially the upper part of it, is getting so thin that the yellow colour of the chrysalis can be distinctly seen through it, whilst a wrinkled mass of the integument has collected round the point where the tail is attached. About this time the skin begins to split on the second segment. The movements of the body now go on almost without intermission, and the opening rapidly widens, till the split extends down the centre of the back, from the head to a little below the loop. Meanwhile the skin goes on steadily sliding down, and accumulating beneath the tail. The reason the skin does not give way will be seen by examining the shrivelled slough immediately after it is cast off, when it will be found to be so firmly glued together by the adhesive nature of its inner surface that it can be only very slightly extended without tearing. When the end of the slit is reached, the tail of the chrysalis gradually emerges and creeps round the accumulated skin, holding on to it all the time, and forcing its way under it till it finally dislodges the empty claspers from their hold and fastens itself at exactly the same spot. The chrysalis next screws itself forcibly round from side to side, until by the twisting of its body, the slough, which is now simply lodged between the tail and the leaf, is presently pushed out on one side or the other and falls to the ground. This having been effected, the body is hunched up, and a little jerk causes the loop to slip so far towards the head end, that any one, not having seen it before, would suppose it to be the result of an unfortunate accident. Such, however, is not the case, and the twisting motion is again continued, causing the silken loop to bury itself in the soft and yielding substance of the body. The chrysalis is now a misshapen-looking greenish yellow object, but in the course of a few hours the upper parts, and especially the wings, develop in a wonderful manner, and assume their permanent character. In about twenty-four hours the colour will have changed to a vivid green, unless indeed the chrysalis is formed in a box or ill-lighted room, when the green permanently retains somewhat of a yellowish hue.

In the natural state, I have invariably found the chrysalis affixed to the back of a leaf, and never once on the food-plant. The caterpillars appear to prefer a rough-leaved plant, such as the bramble, lantana, &c., probably as affording a better hold to the silk.

[The ovum of *Ornithoptera richmondii* is globular, with the base flattened and sunken in the centre; it is wider than high, measuring one-eleventh of an inch in diameter and one-fourteenth of an inch in height; the surface is slightly granular.—F. W. F.]

ANTS AND THEIR COMPANIONS.

By C. W. Dale, F.E.S.

Ants have been known ever since the days of Solomon as being a little people but extremely wise. They were accredited by the ancients with carrying on harvesting operations, which have since been discredited, but have been proved to be fully correct by the researches of Moggridge in the South of France, Forel, and others. They resemble the lords of creation in another particular, that of keeping slaves and pets, and that is what I am going to draw special attention to.

In the 'Entomologist's Annual' for 1857, Mr. Janson draws special attention to the Myrmecophilous Coleoptera, or ants'-nest beetles of Britain, with instructions for obtaining them, and giving a list of thirty-six species. In the following 'Annual' he gives further notes, and states that ants' nests have contributed, within two years, upwards of twenty species of Coleoptera previously unknown as inhabitants of Britain, and have, moreover, yielded, in comparative plenty, no trifling number which were previously unique, or of the greatest rarity in collections. He also finds fault with certain individuals for ruthlessly destroying the nests, and commends the ants to his readers' sympathy.

Since 1858 the list of British Myrmecophilous Coleoptera has been largely added to, as may be seen by reading through the Rev. Canon Fowler's 'Coleoptera of the British Isles.' There are, moreover, various species of Aphides and Coccidæ attached to ants' nests, with a small sprinkling of others belonging to the Psoci, Phoridæ, and Tineidæ, families of the Neuroptera, Diptera, and Lepidoptera; whilst the Thysanura, Acari, and Onisci have also representatives.

FORMICA SANGUINEA, Latr.—This is, *par excellence*, the slave-making ant of our British species. It is local, being found chiefly in the sandy districts of Surrey. In the 'Entomologist's Annual' for 1868 Mr. F. Smith gives a list of nine other species of ants found in a nest of *F. sanguinea* on Shirley Common by Mr. Rothney. *F. fusca*, common; *F. nigra* and *flava*, several specimens; *Tapinoma erratica*, *Myrmica ruginodis*, and *M. scabrinodis*, common; *M. lobicornis*, workers very abundant, but only one female; *Leptothorax acervorum*, all the sexes abundant in August; *L. nylanderi*, several specimens. I can find only two species of Coleoptera recorded as being found in the nest of this ant, viz., *Dinarda maerkeli*, Fries, taken by Messrs. Douglas and Scott near Croydon; and *Hetærius sesquicornis*, Preys.

FORMICA RUFA, L.—In the nests of this species another ant, *Stenamma westwoodii*, seems only to occur. The species of Coleoptera are numerous:—*Aleochara ruficornis*, Grav.; *Oxypoda recondita*, Ter.; *O. formiceticola*, Maerk.; *O. hæmorrhoa*, Mann; *Thiasophila angulata*, Er.; *Dinarda maerkeli*, Fries; *Myrmedonia humeralis*, Grav.; *Notothecta flavipes*, Grav.; *N. anceps*, Er.; *Quedius brevis*, Er.; *Leptacinus formicetorum*, Maerk.; *Dendrophilus pygmæus*, Lin.; *Myrmetes piceus*, Payk.; *Monotoma conicollis*, Aubé; *M. formicetorum*, Thoms.; *Ptenidium formicetorum*, Ter.; *Ptilium myrmecophilum*, All.; *Euplectus signatus*, Reich.; *Batrisus venustus*, Reich.; *Scydmænus godarti*, Latr.; *Neurophes longicollis*, Mots.; *Cetonia ænea*, Gyll. (larvæ); *Clythra quadripunctata* (larvæ); *C. tridentata*, Lin. (larvæ); *Coccinella labilis*, Muls. The following Homoptera occur:—*Paracletus cimiciformis*, Heyd.; *Forda formicaria*, Heyd.; *Trama troglodytes*, Heyd. Also one species of Hemiptera: *Piestostethus formicetorum*, Boh.; and one species of Lepidoptera: *Tinea ochracealla*, Tr.

Formica fuliginosa, L.—The following Coleoptera have been seen in nests of this species:—*Homœusa acuminata*, Maerk.; *Oxypoda longipes*, Mul.; *O. vittata*, Maerk.; *Thiasophila inquilina*, Maerk.; *Myrmedonia haworthi*, Steph.; *M. cognata*, Maerk.; *M. lugens*, Grav.; *M. laticollis*, Maerk.; *Notothecta confusa*, Maerk.; *Quedius brevis*, Er.; *Othius myrmecophilus*, Fries; *Dendrophilus punctatus*, Er.; *Ptenidium turgidum*, Thoms.; *P. formicetorum*, Ter.; *P. gresneri*, Er.; *Batrisus venustus*, Reich.; *Amphotis marginata*, Er. The following species of Homoptera occurs:—*Forda viridana*, Buck.; and of Neuroptera, *Atropos formicaria*, Hagen.

Formica fusca, L.—In the nests of this species occur the following Coleoptera:—*Homœusa acuminata*, Maerk.; *Aleochara ruficornis*, Grav.; *Dinarda dentata*, Grav.; *Artemeles emarginatus*, Grav.; *A. paradoxus*, Grav.; *Myrmedonia limbata*, Payk.; *Hetærius sesquicornis*, Preys.; *Ptenidium kraatzii*, Mitt.; also one species of the Thysanura, *Bechia albinos*, Nic.

Formica nigra, L.—Only two species of Coleoptera have been found in the nests of this species:—*Astilbus caniculatus*, Fab., and *Claviger testaceus*, Preys. The following Homoptera occur:—*Trama troglodytes*, Heyd.; *Paracletus cimiciformis*, Heyd.; *Forda formicaria*, Heyd.; *Endeis carnosa*, Buck.; *Ripersia subterranea*, Newst.; and *Lecanopsis formicarum*, Newst. One species of the Thysanura also occurs: *Bechia albinos*, N.; and one of the Onisci: *Platyarthrus hoffmanseggii*.

Formica flava, L.—The following Coleoptera occur in the nests of this species, under stones:—*Astilbus caniculatus*, Fab.; *Medon bicolor*, Ol.; *Oxypoda hæmorrhoa*, Sahl.; *Claviger testaceus*, Preys.; *Bythinus glabratus*, Rye; *Trichonyx maerkelii*, Aubé. Of Homoptera there are ten species:—*Trama troglodytes*, Heyd.; *Paracletus cimiciformis*, Heyd.; *Forda formicaria*, Heyd.; *Tychea trivialis*, Pass.; *T. setulosa*, Pass.; *T. setariæ*, Pass.; *Endeis formicina*, Buck.; *E. pellucida*, Buck.; *E. carnosa*, Buck.; *Ripersia subterranea*, Buck. One species of Diptera also occurs: *Phora formicarum*, Nees.; one species of the Thysanura: *Bechia albinos*, Nic.; one of the Onisci: *Platyarthrus hoffmanseggii;* also one or two unknown species of Acari.

Tapinoma erratica, Latr.—In a nest of this species at Bournemouth has been found *Myrmedonia plicata*, Er.

Myrmica ruginodis, Nyl.—The following Coleoptera occur in the nests of this species:—*Astilbus caniculatus*, Fab.; *Myrmedonia collaris*, Payk.; *Medon bicolor*, Er.; *Bryaxis hæmatica*, Erich.

Tetramorium cæspitum, L.—In the nests of this species a very remarkable species of ant, *Anergates atratula*, Sch., sometimes occurs. This is the one standing in Curtis's 'Guide' as *Myrmica maculipes*, Curt. It was taken by my father at Charmouth as far back as July 8th, 1835. The following species of Homoptera occur in the nests of this species:—*Ripersia tomlinii*, Newst.; and of Coleoptera, *Tychus glabratus*, Rye, and *Trichonyx maerkellii*, Aubé.

From the foregoing lists it will be seen that the following number of species inhabit ants' nests:—Coleoptera, 54; Lepidoptera, 1; Neuroptera, 1; Hemiptera, 1; Homoptera, 12; Diptera, 1; Thysanura, 1; Acari, 3; Onisci, 1; total, 75 species.

THREE NEW SPECIES OF COCCIDÆ.

By T. D. A. Cockerell,
Entomologist of the New Mexico (U.S.A.) Agricultural Experiment Station.

Ceroplastes iheringi, sp. nov.

Waxy scale greenish white, very irregular, nodose, without distinct plates. Length 4, breadth 4, height 3 mm. Female with the wax removed, 3 mm. long, 2 broad, dark olive-brown. Posterior cleft nearly 1 mm. long. Caudal spine distinct, but very short and broad. Dorsal and lateral projections ill-developed. When boiled in soda, the female produces a strong madder-red colour. Legs yellowish; femur stout; tarsus and tibia of equal length, or tibia a little longer. Claw moderate, curved. Digitules of claw very remarkable, brown, darker than leg or claw, long, extending considerably beyond tip of claw, stout, sub-bulbous at base, with very large round knobs. Tarsal digitules slender, with large brown knobs, but these not so large as those of the claw-digitules. Antennæ pale brownish, cylindrical, not or hardly tapering, distinctly 8-jointed; 3 and 4 about equal and longest; then 8 and 2 about equal; 5, 6, and 7 short and subequal, about as long as broad, 6 the shortest. Formula of antennæ (34) (821) (57) 6. Last joint suddenly narrowed before its middle, and bearing several hairs.

Hab. Rio Grande do Sul, Brazil; on *Baccharis platensis*, Griset. Collected by Dr. H. von Ihering. *Baccharis* is a genus of Compositæ of the tribe Asteroideæ.

Dr. von Ihering sent the specimens in alcohol; but at the same time sent dry specimens of the same species, also on *Baccharis* (species not stated), from Sao Paulo, Brazil. These latter specimens show two lines of white secretion on each side; they also show the spine or "tail" larger, though still very stout. The two localities for the species are about 600 miles apart.

Allied to *C. ceriferus* and *C. fairmairei* (which Maskell considers a synonym of *ceriferus*), but distinguished readily by its comparatively small size, its 8-jointed antennæ, and the details of the feet.

KERMES GILLETTEI, sp. nov.

Scale of female 8 mm. long, 7½ broad, 7 high. Distinctly segmented; dorsum with rounded tuberosities, not very shiny. Scale covered with minute dark brown specks. General colour ivory-white and dark brown mottled, the extent of the white or the brown variable, but usually a distinct white dorsal band, and more or less broken-up subdorsal ones. Derm by transmitted light reddish brown, with large oval gland-pits. Young larva very elongate, subfusiform, with the greatest breadth anterior to the middle; pale purplish pink. Caudal tubercles large and broad, each presenting two stout bristles, of which the inner (mesad) one is much the shortest. There is also a moderately long bristle on the outer side of each tubercle, near its base. Segmentation distinct; each segment with a short spine or bristle on lateral margin. Antennæ cylindrical, hardly at all tapering, 6-jointed; 3 and 6 equal and longest; 4 and 5 equal and shortest, these being about as long as broad; 2 very little longer than 4, and very much shorter than 3; 3 almost as long as 4 + 5. Last joint rounded at the tip, bearing several hairs. Antennæ colourless. Rostral loop extending beyond base of 3rd pair of legs. Mentum at least 2-jointed. Legs quite ordinary. Claw long, sharp, and a little curved. Tibia short.

Hab. Manitou, Colorado, U. S. A., on twigs of *Quercus undulata*. Collected by Prof. C. P. Gillette. Very distinct from *K. galliformis*, Riley, the only *Kermes* hitherto described from North America. Its nearest ally is evidently *Kermes gibbosus*, Signoret, which was found on oaks near Vienna.

The larvæ described above were found inside the scale of the female.

PHYSOKERMES COLORADENSIS, sp. nov.

Female scale with the same general shape as *P. abietis*, and attached in the same way to the twigs. Diam. 7 mm., smooth, shiny, rather pale brown, inflated, subreniform, with a median constriction. Derm yellowish brown, reticulate, the reticulations hexagonal. Large gland-pits looking like perforations. Mouth-parts small, rostral loop short. Legs not to be found, apparently absent in the adult. Antennæ small, 6-jointed, but the joints obscure. Last joint with several hairs. Joints subequal, except 2 and 5, which are shorter; 2 shortest, bearing a long hair; 4 perhaps a very little longer than 3, and longest; 5 constricted, simulating 2 joints, the second of them shortest.

Hab. Manitou, Colorado, Nov. 26th, 1894, on *Pinus edulis*. Collected by Prof. C. P. Gillette. It is attacked by a brownish Chalcidid parasite.

From the European *P. abietis* it is distinguished by its size and by the antennæ. No species of the genus has hitherto been found in America.

Las Cruces, New Mexico, Dec. 21st, 1894.

ON THE CAUSES OF VARIATION AND ABERRATION IN THE IMAGO STAGE OF BUTTERFLIES, WITH SUGGESTIONS ON THE ESTABLISHMENT OF NEW SPECIES.

By Dr. M. Standfuss, Lecturer in both Academies at Zürich. Translated by F. A. Dixey, M.A., M.D., Fellow of Wadham College, Oxford.

(Continued from p. 76.)

III. The Pupa.

Degrees of temperature and of humidity are in this case the only influencing conditions as to which anything can be said. Nevertheless the very numerous experiments which I have for some years conducted on the pupæ of a series of species, and moreover on large numbers of individuals of each species, with regard to the influence of varying temperature, have led to most remarkable results. I can truly say that during the period of more than twenty-five years which I have devoted to practical biological studies in entomology, I have never had before me anything approaching the astonishing results to which I am now referring. Can it be called anything but astonishing that it should be possible, by means of a simple experiment, to make larvæ of *P. machaon*, collected near Zürich, develop into a form of the perfect insect such as that which flies in August in Syria, perhaps near Antioch and Jerusalem? Or that from German and Swiss pupæ of *Vanessa antiopa*, L., by the action of well-defined factors, there should be produced an imago which in part comes very near to the Mexican *V. cyanomelas*, Doubl. Hew.? Or to force at will the one half of the progeny of one and the same female *V. cardui*, L., to develop into a form of the perfect insect almost identical with that occurring in the German possessions in Africa, and the other half to assume an aspect like that of *V. cardui* at the northernmost limit of its range, for instance, in Lapland? And apart from these glimpses into the causes of the variation of species, and into the nature of the species as such, a vista also opens out of the very relations of affinity, of the conditions of phylogeny, and of the derivation of one species from another.

In the collection of my father, who left me ten years ago all he had in the way of Lepidoptera, I possess a pair of *V.* ab. *porima*, O., the intermediate form between *V. levana*, L., and *V. prorsa*, L., labelled "Magdeburg, 1852; pupæ kept in cellar." The fundamental idea of the following experiments is therefore substantially forty years old, even if a still earlier date should not be forthcoming from some other quarter. I know of no publication on this subject reaching back so far as the fifties.

First in 1864, Georg Dorfmeister published, in the 'Mittheil. d. Naturwiss. Vereins für Steiermark,' a memoir "On the Influence of varying Degrees of Temperature, applied during the Period of Development, on the Colouring and Marking of Butterflies." This was followed, in 1880, by another memoir of Dorfmeister, "On the Influence of Temperature on the production of Variation in Butterflies" (Graz, 1880).

The best treatise on the subject has been published by Weismann, *viz.*, 'Ueber den Saison-Dimorphismus der Schmetterlinge'* (Leipzig, 1875).

Amongst additional literature on the same question may here be mentioned:—W. H. Edwards, "An Abstract of Dr. Aug. Weismann's Paper on Seasonal Dimorphism of Butterflies, to which is appended a Statement of some Experiments made upon *Papilio ajax*" ('Canadian Entomologist,' 1875, No. 7, pp. 228—240). G. Stange, "Experiments with a lowered Temperature on *Agrotis pronuba*, L., and *Cidaria tristata*, L." (Stettin. Entom. Zeit. 1886, p. 279). C. Ed. Venus, in 'Iris' (Dresden, 1888, pp. 209, 210). (*V. urticæ* was exposed to intense sunlight in the larval and pupal condition.)

All the above-mentioned treatises deal with the modifications produced by the action of certain degrees of temperature, applied during the pupal stage, on the aspect of the resulting imago, in the light of the species by itself—considered, that is, as a separate entity—without reference to its affinities with other species; and, indeed, the greater number of species hitherto subjected to these experiments have not been forms calculated to open up a further vista of phylogeny.

We will, however, let the present experiments, with their results, speak for themselves. They were conducted in the following manner:—

(1) Those pupæ only were used whose larvæ had fed up at the normal temperature of a room from the middle of May to the middle of August.

(2) The pupæ were taken for experiment as soon as they appeared perfectly formed and hardened; when they had lost, that is, the peculiar greasy gloss of most species in a perfectly fresh condition.†

(3) Most use was made of such species as live in societies, and can therefore be obtained in large broods. In this manner large groups of individuals derived from the same parents, and so bringing to the experiment approximately the same family characteristics, were employed almost throughout.

(4) One portion of each brood was put into a refrigerator, the temperature of which varied between 5° and 8° C. (41°—47° F.).

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* Translated and edited in English by Professor Meldola.

† Quite fresh pupæ are not suited for experiments that involve a lowered temperature.

Inasmuch as at this temperature not one of the species examined developed the perfect insect, it would have been theoretically possible to vary the period of exposure at pleasure; the practical result, however, showed that in the case of most species employed the possible duration of exposure had well-defined limits.

A second portion of each brood was allowed to develop the perfect insects at the normal temperature of the room; a careful control-experiment seeming to be desirable.

A third portion underwent development at a raised temperature. I must here offer my special thanks to Dr. Stebler, Director of the Agricultural Laboratory of the Federal Polytechnicum, for not only placing some of the apparatus of the Station at my unconditional disposal, but also for having it especially prepared for my object. The apparatus made use of by me, the temperature of which was very easily regulated, was fitted with glass doors, which enabled the light to enter freely.

Let us now turn to the most essential features of the results obtained in the case of those species which were subjected to experiment in large or at least considerable numbers.

1. *P. machaon*, L. (Larvæ from Zürich.)

a. Warmth.

From 17 pupæ kept at 37° C. (98°—99° F.), I obtained, in 7—10 days, 15 well-developed perfect insects. *Upper surface.*—The general colouring is much lighter than in the normal second brood in this locality, in consequence of a strong yellow powdering of the black patch at the base of the fore wings, of the toothed outer band, and of the four first ribs reckoned from the dorsal border.* The blue band of the hind wing is further removed from the margin, and in 50 per cent. of the specimens one or two of its projections reach the black arch that closes the central cell; this being otherwise exclusively characteristic of forms of much more southerly origin. The fore wing is strongly curved, the hind wing has its outer margin deeply indented between the ribs, and is furnished with a conspicuously elongated tail (with an expansion of 76 millim. the tail measures 10 millim.). Our Zürich summer form has, with the same expansion, a tail only two-thirds as long. With this conspicuous modification in the form of the wing is evidently connected the enlargement of the yellow marginal crescents on the outer border. The abdomen assumes a prevailing yellow tint, the black lateral lines becoming much reduced throughout, and in two examples being entirely obliterated by a yellow powdering. In the same way the black stripe on the back of the abdomen is more or less lost, in two specimens almost entirely so. The thorax also is rendered much lighter in colour by an increase in the number of yellow scales.

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* N.B.—The "dorsal" border in Dr. Standfuss's paper=what is usually called in this country the "inner" or "posterior" border.

Under side. In correspondence with the modification of the upper side, much of the black marking is obliterated by yellow scales. In two specimens, for example, the black marginal line has completely disappeared, with the exception of a few black scales constituting a scarcely perceptible relic.

Some of these specimens, as already remarked, bear a perfect resemblance to those that fly in August in the neighbourhood of Antioch and Jerusalem.

b. Cold.

One portion of the pupæ, consisting of 24 specimens, which were kept for 28 days in the refrigerator, yielded only two specimens. These resemble the Swiss and German form of *P. machaon*, L., from hybernated pupæ.

With regard to *Apatura iris*, L., *A. ilia*, Schiff, and *Limenitis camilla*, Schiff, the material subjected to experiment was not sufficient to give any certain conclusion.

2. *Vanessa c-album.*

a. Warmth.

This species also, like *P. machaon*, L., whether at a raised or a lowered temperature, gave rise only to forms such as those occurring on the earth at the present time. Pupæ kept at 37° C. (98°—99° F.) gave origin, after 6—8 days, to the light-coloured, yellowish-brown form of the butterfly, especially pale on the under surface, with less sharply defined markings and less deeply indented margins to the wings.

b. Cold.

Pupæ kept on the ice for 28 days produced, after 7—10 days more, the form with much more sharply defined markings, a considerably darker under side, in many cases mingled with moss-green tints, and a more deeply indented margin to the wings.

An exact comparison of the measurement of the wings makes it extremely probable that the modified shape of the wings in the "warmed" form of *P. machaon*, L., arises from the fact that certain of the nervures are much elongated as compared with the "cooled" form; whereas the more deeply indented margin of the "cooled" form of *V. c-album* is due to arrested development of certain parts of the wing, especially the intercostal portions.

3. *V. polychloros*, L.

a. Warmth.

Five days at 37° C. (98°—99° F.), then at 25° C. up to the emergence of the butterflies on the 9th—12th day. The result was a reduction of the blue marginal spots of the hind wing and of the dark outer border of the fore wing. There was also a brightening of the wings by an increased paleness of the brown ground colour, and by a multiplication of yellow scales between the black spots of the costal margin of the fore wing and on the outer border of the black spot at the root of the hind wing.

The under side of both wings was rendered more uniform in colour by the fact that, while the outer portion became darker, the basal portion remained of almost the same colour.

b. Cold.

(1) After a 14-days' sojourn of the pupæ on ice, the butterflies appeared in the room in 7—10 days longer.

The brown ground colour becomes darker, the blue marginal spots of the hind wing larger and brighter, the dark outer border of the fore wing broader; three ill-defined blue spots appear in the middle of the outer border.

On the under side the contrast between the basal and external portions of the wing is enhanced by the increased lightness of the latter.

(2) After 28 days of exposure to cold the butterflies emerged at the ordinary temperature of the room in 9—12 days more.

These showed all the divergent characters above described in increased measure—the much broader and darker outer border of the fore wing, with its distinct blue spots, making this a far more showy insect than the normal form.

Besides this, the spot lying nearest to the root of the wing on the dorsal margin of the fore wing in these specimens often disappears, as also, in rare cases, the spot lying nearer to the outer margin; moreover, there are sometimes indications of the disintegration of the double spot in the middle of the fore wing.

On the under side the tint of the outer portion of the wings mostly becomes lighter; in one specimen it may even be called a dingy sulphur-yellow.

(3) After 42 days' exposure upon ice only 20 per cent. of the pupæ, 13—16 days afterwards, yielded well-developed butterflies. These are for the most part normal in the fore wings; in two cases, however, the four spots lying nearest to the dorsal margin are more or less wanting, whilst on the hind wing the black basal patch is markedly or entirely deficient; and in the same way the blue marginal spots have more or less completely vanished, their places being taken by very small sharply defined black triangles. On the under side of both wings the well-marked lightening of the colour of the outer portion disappears, being replaced in almost all instances by a very peculiar tinge of reddish brown.

4. *V. urticæ*, L.

a. Warmth.

Pupæ kept for 60 hours at 37° C. (98°—99° F.) yielded butterflies at the temperature of the room in 80—100 hours after.

The blue spots on the outer margin, especially of the fore wing, disappear, as also do more or less the pair of spots in the middle of the fore wing.

The black spot on the dorsal margin becomes at least much smaller; in one specimen it has all but gone. Moreover, the black basal patch on the hind wing is substantially lessened in extent. The under side of both wings is conspicuously darker.

To speak briefly, these points indicate an approach to var. *ichnusa*, Bon., which form indeed would be produced in its typical aspect if all the characteristics mentioned were united in one individual. Amongst the material so far before me, however, there is no such individual to be found. But all these characteristics indicate a certain approach of the ordinary type of *V. urticæ*, L., to *V. io*, L.

b. Cold.

Pupæ kept 32 days in the refrigerator gave the perfect insect after 9—10 more days in the room.

The blue on the outer border is much increased; the black spots on the costal margin and in the middle of the wing, and more particularly the spot on the dorsal margin, show an increase in size and depth of colouring. In one-fourth of the specimens obtained there appeared a black transverse shade between the largest costal spot and the spot on the dorsal margin, so that a third, and in many individuals almost one-half, of the fore wing seemed blackened from the base outwards.

These specimens, by the above-mentioned characters, strongly recall the North American *V. milberti*, Godt.; they are, however, readily distinguished by one handsome feature not possessed by *V. milberti*, viz., the specially strong development of the blue of the outer border, and the presence of blue streaks extending from the white costal spot to the apex of the fore wing. The under side of the hind wing is darker than in normal specimens, as are also the tip and basal portion of the fore wing.

Pupæ of *V. urticæ* kept upon ice for 42 days, and emerging in the room 13—14 days afterwards, lost all but a small relic of the beautiful blue spots on the outer border, and, so far as the black markings are concerned, show on the whole less deviation from the normal form than the specimens just described, which remained in the refrigerator as pupæ for 32 days. Many of these specimens are indistinguishable from the northern var. *polaris*.

5. *Vanessa io*, L.

a. Warmth.

Pupæ kept 72 hours at 37° C. (98°—99° F.) produced the perfect insects in 4 or 5 days afterwards. These were of the ordinary form with but slight modification.

The ground colour of the fore wings becomes of a darker reddish brown; one portion of the blue on the apex of the wings is deficient, and the black ground colour here becomes evident.

On the hind wings the pale annulus surrounding the ocellus disappears from the outer margin, and the dark ground colour accordingly extends inwards. The under side of both fore and hind wing becomes darker and more uniform in tint, whilst nearly all the *Vanessa*-pattern, which is still indicated in the normal form, is lost.

b. Cold.

(1) Pupæ kept in the refrigerator 35 days produced the perfect insect in 12—14 days afterwards, in the room; 25 per cent. of the butterflies were crippled. I have described this form in the present Journal for Dec. 1st, 1892, as *V. io*, ab. *fischeri*, and have in the same place already drawn attention to the fact that it is of especial interest as affording an insight into the way in which the derivation of *V. io* from *V. urticæ*, L., and its nearest relatives has taken place,—an insight, that is to say, into phylogenetic relations.

The chief characteristics of this form are: the reduction in number of the blue scales on both fore and hind wings, and the darker appearance of the outer margin in both wings.

Besides this there occur on the fore wings, at the junction of the outer border with the reddish brown ground colour, some small isolated groups of deep black scales, mingled with which appear a few detached blue scales.

The black costal patch lying close to the root of the wing undergoes a further extension inwards.

On the under side the pattern is much more sharply defined than in the normal, the elements of the pattern being largely marked out in brown scales.

All these characters of the pattern betoken an approach to the type of *V. urticæ*.

(2) In addition to these features there occurred others in the case of pupæ kept for 42 days in the refrigerator, the butterflies (of which only 10 per cent. were good specimens) emerging in the room from 14—18 days later. These were as follows:—

α. The ground colour of the wings showed a strong admixture of yellow.

β. In some individuals there appeared a black spot on the dorsal margin of the fore wing, in exactly the same place as the corresponding spot in *V. urticæ*.

γ. The ocellus on the hind wing was frequently much reduced, in some almost to the point of complete disappearance.

δ. The region which constitutes the middle of the ocellus at the apex of the fore wing acquired numerous black scales, thus resembling the corresponding black spot in *V. urticæ*.

ε. In a number of individuals the brown scales on the under side of both wings increased to such an extent that the character of *V. io* was in these instances entirely lost, and the under side acquired a much greater resemblance to that of *V. urticæ* or *V. polychloros*, L.

Besides these forms showing a transition to *V. urticæ*, L., a form was also produced exceptionally (properly therefore an aberration) which may occasionally be met with in nature. Its chief peculiarities are the enlargement of the black costal spot internal to the ocellus of the fore wing, the darkening of the inner part of that ocellus, and the disappearance of the ocellus from the hind wing.

6. *V. antiopa*, L.

A species which reacts to different degrees of temperature hardly less markedly than *V. io*, and on this account of the highest interest.

a. Warmth.

Pupæ exposed for 48 hours to 37° C. (98°—99° F.) yielded the perfect insects 10 days later in the room.

In these the blue of the outer margin seemed to be more or less reduced.

On the hind wing the yellow outer border, especially from the tail-like projection to the dorsal (anal) angle, is broader than in normal specimens, which leads to a displacement inwards of the blue and also of the ground colour of the wing.

On the fore wing the yellow reaches in a wavy or simply arched form up to the row of blue spots, in this manner more or less crowding them out. No very characteristic variation of aspect, however, from the typical form of the species occurs in these examples by the mere fact that the blue points undergo a very marked reduction, even to the size of a large pin's-head, as is the case in a series of my specimens, or even, as in a few individuals, to still smaller dimensions; for both the ground colour and the outer border scarcely differ in any appreciable degree from the normal colouring of the species.

The hind wing also shows no difference as compared with the type-form, except for the slight blackening of the margin.

But under the above-mentioned treatment of the pupæ of *V. antiopa* there arose among the specimens just described, in a few isolated instances only (about 2 per cent.), another divergent and very remarkable creature, which may accordingly be spoken of as a true "aberration." This I shall at once describe more minutely, as under another kind of treatment of the pupa the same form occurs constantly,—becoming, therefore, a true "variety."

Pupæ of *V. antiopa* exposed for 60 hours to a temperature of 37° C. (98°—99° F.), and then kept at 24° C. (75° F.), produced, 12 days after pupation, a butterfly which, among all the forms hitherto obtained by me in these experiments, departed most widely from the normal type. To this form I have given the name of *V. antiopa* var. *daubi*, Stdfs., in honour of my friend Daub, of Karlsruhe.

It is only the keen and intelligent interest in the scientific bearing of entomology, and the considerable pecuniary sacrifices which are brought by men like my valued friend Daub to the study of these favourites of theirs, that make the investigation—in many respects a thorny one—of this branch of zoology possible to the specialist.

On the upper surface of this very beautiful form the brown ground colour is darkened, especially on the hind wing, which sometimes seems almost black. The blue marginal points, reduced to about half their normal size, show a tinge of violet. But what impresses on this creature its strongly divergent character is the extraordinary darkening of the yellow border of both pairs of wings, which in the most extreme examples shows only a small remnant of the yellow scales.

Besides this the blackened border is seen on the fore wing to have a waved outline corresponding to the occurrence of the blue spots, whilst generally keeping on the hind wing to the normal form.

A remarkable feature in most of the specimens is the strongly excavated dorsal margin of the fore wing, a result of which is that the dorsal angle is markedly less than in normal examples. Besides this the outer border of both pairs of wings is drawn out into less projecting points than in the usual form.

On the *under side* this fine creature is as much darkened as on the upper surface.

The ground colour is an almost pure black shot with moirée; with the exception of the two white costal patches there are scarcely any markings to be seen; moreover, the outer border of both pairs of wings, by reason of its strong black colouring, presents scarcely any contrast of importance with the tint of the rest of the wing; some specimens, however, occur in which this contrast is sufficiently apparent.

These latter specimens are also darkened to a less degree on the upper surface, and they vividly recall the Mexican *V. cyanomelas*, Doubl. Hew.

b. Cold.

(1) 29—34 days in the refrigerator; then 12—13 days at the normal temperature.

Corresponding to the different amount of exposure there is a series of very diverse forms.

The brown ground colour becomes lighter in varying degrees, and the blue marginal spots, which in these cases become much enlarged on the fore wings only, each acquire separately an encircling black ring. In other words, the continuous black submarginal streak, which in the normal *V. antiopa* forms the boundary between the basal brown and the marginal yellow, and in which occur the groups of blue scales, is here resolved into isolated black wedge-shaped spots, the centres of which are embellished with blue.

Thus there appeared features like those shown at the present day by *V. urticæ*, L., *V. polychloros*, L., &c., on the upper surface of the hind wing.

Internally to the black wedge-shaped marks on both wings, and with especial distinctness below the yellowish wedge on the apex of the fore wing, are found yellowish scales like those that occur very plainly in certain cooled forms of *V. polychloros*.

Moreover, in a few individuals there appear, in the light brown area of the wing, two large dark spots just in the position of the two spots near the centre of the fore wing in *V. polychloros*, *V. urticæ*, &c.

Besides this, the spots on the costal margin, shown by *V. polychloros* and its nearest relatives, appear as dark markings in these lighter-coloured specimens of *V. antiopa*.

In correspondence with these features of the upper surface, the under side also, especially of the hind wing, exhibits a substantial approach to the type of the *polychloros* group ; inasmuch as the details of the pattern which in *V. antiopa* are usually so confused stand out more clearly from the ground colour ; being in these forms distinctly outlined with brown scales, quite similarly, in fact, to what has been described above in the cooled form of *V. io*.

(2) Thirty-nine days in the refrigerator, 14—16 at the normal temperature.

The most conspicuous features of this form are the increase of the blue and the narrowing of the yellow outer border of both pairs of wings. The brown ground colour is also somewhat darkened, more so on the hind wing than the fore wing, as compared with normal specimens. In a few specimens the blue of the hind wing not only reaches right up to the yellow border, but also intrudes into it in the form of more or less acute projections. This last form is of quite singular beauty.

The under side has the pale outer border similarly narrowed, and shows slight indications of an approach to the type of *V. polychloros*, &c., resulting, as in the case of the above-described form, from the arrangement of the brownish scales. In other respects, however, there is no marked deviation from the normal.

(3) Forty-four days in the refrigerator, 15—19 days at the normal temperature, 60 per cent. of the butterflies emerging in good condition.

Upper surface.—The yellow outer band becomes, as a rule, still further narrowed, and acquires a plentiful admixture of black scales.

The blue is everywhere considerably increased, and in the hind wing seems almost invariably to have acquired the tendency to intrude by angular projections into the yellow border. The ground colour of the hind wing becomes of a splendid velvety black; that of the fore wing is also very markedly darkened.

Under surface.—The pale border is here also correspondingly narrowed, and is thickly beset with black scales, especially towards the tip of the fore wing.

The remainder of the surface is deep black, and all the markings are very indistinct; moreover, the two white costal spots on the fore wing are considerably reduced in consequence of a powdering of black.

As far back as the autumn of 1893, I bestowed on this beautiful form the name of *V. antiopa* ab. *roederi*, Stdfs., after my valued friend Röder, of Wiesbaden. He, too, is one of the men who in these matter-of-fact times of ours have not lost their interest in these little masterpieces of Nature's handicraft.

7. *Vanessa atalanta*, L.

a. Warmth.

Seventy-two hours at 37° C. (98°—99° F.), then 3—4 days at 24° C. (75° F.) until the butterflies emerged.

Upper surface.—The outer marginal blue of the fore wing becomes so much reduced that in most individuals there only remain visible two small spots near the apex.

The red cross-band of the fore wing becomes widened to a greater or less extent; this in some individuals is carried to such a point at the costal margin that the black patch lying just internally to this region becomes completely annulated with red. This showy cross-band is also widened on the external aspect.

Besides this, there occurs an abundant reddish-brown shading on the black portion of the fore wing near the root.

The large white patch on the costal margin of the fore wing, and the five white spots lying in a curve externally to this, show an undoubted tendency towards reduction; in some individuals the fifth of these spots, that namely that lies close to the red band, vanishes altogether.

All these features approximate towards *V. callirrhoë*, F., and its local forms, var. *vulcania*, Godt., from the Canaries, &c.

The occasional enlargement of the black points in the red outer border of the hind wing must also be considered an approach [to these forms]. On the other hand, there is a further most remarkable characteristic of these specimens produced at a raised temperature which, from this point of view, is not easily explained; this is the occurrence, in about 50 per cent. of the individuals reared under the above-mentioned conditions, of a bright red powdering between the second and third of the five white spots near the apex of the fore wing already mentioned. This powdering is sometimes prolonged, following the course of the nervure that here traverses the wing, almost up to the large white costal patch.

This striking peculiarity, though in a less marked form, occurs also in one individual between the third and fourth of these five spots.

Under surface.—The most remarkable characteristic of the fore wing is again the widening of the red cross-band. Moreover, there occurs with some frequency a red spot in the black ground colour of the region of the wing adjacent to the dorsal border, in the exact situation where, in *V. callirrhoë*, the red area of the wing projects outwards.

The hind wings show but little departure from the normal condition; the triangular light spot about the middle of the costal margin is, however, in these warmed specimens, rendered less distinct by a powdering of dark scales.

b. Cold.

(1) Thirty-one days in the ice-box, then 8 days at normal temperature.

Here, as in the warmed specimens of *V. atalanta*, there is much individual variation.

The chief reason for this may be that in this species it is not possible to collect large broods from the same parents; the insects while being reared, even though much material of the same species is employed, are therefore not passing contemporaneously in large numbers through the same stages of development, for which reason it is almost impossible to subject a large proportion of individuals in quite the same stage of growth either to a raised or lowered temperature; moreover, quite apart from this consideration, the insects, derived as they are from many different stocks, interfere with the experiments by introducing a greater diversity of qualities than would be the case in large broods coming from the same parents.

Upper surface.—The white costal spot becomes enlarged; the red band of the fore wing is intersected in the middle by two black transverse shades, distant from each other about 1½ millimetres; the space between these transverse shades is at times almost completely filled in with black scales. In the same way the lowest part of the red cross-band, on the dorsal margin, usually becomes cut off by a black line which follows the course of the nervure that occurs here [*i.e.* the first median nervule].

In extreme cases the red patch thus cut off on the dorsal edge is almost obliterated by a black powdering. Blue scales are also found between the white costal patch and the red band, and in a few cases on the dorsal margin internally to the latter.

On the hind wing the black points in the red band on the outer margin diminish in size, and acquire, like the terminations of the nervures which lie within this band, a powdering of blue or yellowish scales. The blue spot on the anal angle assumes larger dimensions.

Under side.—The blue between the white costal patch and the red band of the fore wing becomes conspicuously increased.

The black transverse shades that intersect the red band, which becomes tinged with violet, are here also well marked. The hind wings assume a washed-out, confused pattern, and show throughout, but especially on the outer and anterior border, a well-marked lightening of colour, due to an abundant infusion of yellow and blue tints.

(2) Forty-two days in ice-box, the butterflies appearing at the normal temperature 12—14 days afterwards.

Twelve pupæ yielded ten almost normal perfect insects. One pupa succumbed to the conditions of the experiment.

The eleventh butterfly resembled the extremely abnormal forms already described; the white costal patch on the fore wing, however, instead of being enlarged, was slighter than in normal specimens.

(To be continued.)

AUSTRALIAN HEPIALIDÆ.

By A. Sidney Olliff,

Government Entomologist, New South Wales.

The brilliantly-coloured ghost-moths, so well known to every lepidopterist in Australia and New Zealand under the name *Charagia*, have been obtained in more than usual numbers during the past two seasons, a fact which it is no fancy to attribute in a large measure to the recent disastrous strikes in the Newcastle coal trade. The enforced idleness of many of the mines, and the consequent want of employment, have given much unwelcome leisure to the small band of miner-collectors on whom we chiefly depend for our supply of specimens, and they have not been slow to avail themselves of the opportunity to devote some of their time to collecting the wood-eating Lepidoptera which make their homes in the scrublands of the Lower Hunter River.

It is rarely that more than worn and solitary specimens of these giant ghost-moths are obtained by any but resident collectors, as they are very retiring and sluggish in their habits; but it is comparatively easy to breed the larvæ in captivity, provided that the wood in which they are living is not cut until they are nearly full-grown; and it is by leaving the game untouched, and returning to cut out the portion of wood containing the grub when the inmate has turned, or is about to turn, to the pupal stage, that the collector is best able to secure satisfactory results.

The size of the opening of the burrow, which is enlarged from time to time to meet the requirements of the rapidly growing larva, and the texture and the degree of dryness of the bag-like covering, formed of coarse silk and triturated wood and bark, with which it protects the entrance to this burrow, are characteristics that guide the experienced collector in deciding when the infested limb should be cut. If these limbs and their contents are kept in damp sand in a cool and airy place, a fair proportion of successful breedings may be counted upon, but it is no uncommon thing for the emergence of the moths to be delayed for one, or even two, seasons.

The large increase of attention lately bestowed upon the collecting and breeding of these attractive moths, has served to illustrate in the most forcible way their growing scarcity in the Hunter River districts, a scarcity that is directly due to the rapid disappearance of the scrub timber in the mining centres, and to the zealousness with which that now standing is guarded by the coalowners. Although considerable damage undoubtedly results to useful timbers and shrubs, such as black apple (*Achras australis*), native hop (*Dodonæa viscosa*), wattle (*Acacia decurrens*), grey gum (*Eucalyptus tereticornis*), and various other Eucalypts, from the attacks of these lignivorous caterpillars, I have found from personal experience that the average mine-manager is not to be persuaded that one is doing him a service by felling even unhealthy-looking saplings infested with these grubs. He rather inclines to the view that poor-looking timber is better than none at all.

The increasing rarity of these insects is emphasised by the almost complete absence of the larger and rarer species which occurred in fair numbers in former years when collectors were few. The vast bulk of the specimens now obtained belong to the most widely distributed species, *Charagia lignivora*, Lw., *C. splendens*, Sc., and *C. eximia*, Sc. The *C. lewini*, Walk., occurred more rarely, and the silver-spangled *C. ramsayi*, Sc., was only found once or twice, all the examples being females, and *C. scotti*, Sc. (W. S. Macleay MS.), only on a single occasion. The *Zelotypia stacyi*, Sc., or "Bentwing" of the miners, the largest of the Hepialidæ, and one of the largest known moths, was very scarce, and its variety *sinuosa*, Oll., did not occur once.

It is satisfactory to be able to add that the typical form of this magnificent moth has recently been found at Mt. Victoria, a summer resort in the Blue Mountains, 3422 feet above the sea-level. Besides the valley of the Hunter River, the only previously known locality for the species was the Manning River, ninety miles further north.

The following descriptions are from dry, and therefore faded, specimens. The vivid green and red of the living insects quickly fades after death, in many cases turning to brown, drab, and dusky red.

CHARAGIA CELSISSIMA, sp. n.

♀. Antennæ reddish brown, tapering towards the extremity. Head, thorax, and abdomen bright grass-green; the thorax brownish in front and at the sides; the abdomen much elongated, anal tufts inclining to reddish brown. Fore wing elongate, ample, bright grass-green, somewhat shining, the costa comparatively straight, the hind and inner margins conspicuously and moderately strongly bordered with dusky brown; the apical angle obtuse, the hinder angle strongly rounded, with two rather broad transverse shining whitish silvery markings towards the apex; the innermost just beyond the discoidal cell moderately broad, extending from vein two to vein ten, interrupted and inflexed at vein three and between veins 6—7; the outermost about midway between the innermost and the hind margin, narrower, parallel to the first, and extending from between veins 3—4 to between veins 8—9, broken into spots between veins 6—7, 7—8, and 8—10; both markings broadly outlined with dusky brown. Hind wing dusky salmon-colour, inclining to reddish brown at the base, apical angle obtusely rounded, hinder angle regularly and gradually rounded. Under side dusky salmon-colour, lighter towards the hind margin; obscurely barred with brown beyond basal third of costa. Expanse of wings, 145 mm.; length of body, 172 mm.

Port Darwin, N. Australia; a single female.

Allied to the West Australian *Charagia scripta*, Sc., but easily distinguished by its larger size, and less extensive, and very different markings.

CHARAGIA WALSINGHAMI, sp. n.

♀. Antennæ pale reddish brown. Head and thorax bright grass-green, the latter dusky brown at the sides; the abdomen very long, reddish at the extremity. Fore wing bright grass-green, with indistinct transverse wavy brown markings; costa, at the basal half, with five irregular broad dusky brown markings; a few small irregular dots on anterior and posterior margins of discoidal cell; irregular parallel series of transverse single linear markings and patches between veins 1—9; two conspicuous brown ovate patches just beyond discoidal cell, between veins 5—6 and 6—7. Hind wing pale pinkish salmon-colour. Under side pale salmon-colour, suffused externally with golden yellow; costa of fore wing obscurely barred with brown. Expanse of wings, 110 mm.; length of body, 67 mm.

Mt. Bartle Frere, Queensland; a single female specimen.

A distinct and beautiful species, with an abnormally long abdomen, most nearly approaching *Charagia eximia*, Sc. It is dedicated to Lord Walsingham.

CHARAGIA COREEBA, sp. n.

♀. Antennæ reddish brown. Head, thorax, and abdomen bright grass-green. Fore wing bright grass-green, with distinct irregular dusky brown markings; costa with five or six irregular brownish markings at intervals; an irregular W-like double brown marking just beyond the middle of the discoidal cell; a row of irregular transverse brown markings beyond the cell, parallel to the hind margin; of these one near the costa, at its basal five-sevenths, is a rectangular interruption of the two outermost costal markings, and another of the series is a double linear marking extending from veins 2—5, its inner outline interrupted at vein two; a row of double irregular markings between veins 4—9, near, and parallel to, the hind margin; another simple row of similar markings about the middle of the inner margin. Hind wing pinkish salmon-colour, pale golden yellow externally, veins at hind margin pale golden yellow. Under side pale salmon-colour, suffused with golden yellow externally; costa of fore wing obscurely barred with brown. Expanse of wings, 96 mm.; length of body, 45 mm.

Newcastle, Ash Island, Hunter River, New South Wales; two females.

Closely allied to *Charagia eximia*, Sc., and *C. scotti*, Sc., but readily recognisable by its more numerous and more diffused markings. It agrees with the female of the former species (described by me in Scott's 'Australian Lepidoptera,' vol. ii. p. 8, 1890) in outline, and does not possess the silvery spots beyond the discoidal cell of the fore wing which are so conspicuous in that species.

The name *Coreeba* is the aboriginal equivalent for Ash Island.

Charagia has recently been sunk in the old and extensive genus *Hepialus*, of which the typical species is *H. humuli*, Linn., and *Zelotypia* has been merged in the South African genus *Leto*; but I propose to retain both these groups, as I consider them to be convenient divisions affording characters of generic value; and for the same reason I also propose to retain *Trictena*, lately sunk in *Pielus*. In spite of recent revision, and still more recent cataloguing, the species of these latter genera and their immediate allies are in an extraordinary state of confusion; but I need say nothing further in regard to them here, as I am discussing their synonymy, and giving my views of the value of *Charagia*, *Zelotypia*, and *Trictena*, in another place.

Department of Agriculture, Sydney, December 17th, 1894.

A CATALOGUE OF THE MACRO-LEPIDOPTERA OF DERBYSHIRE.

By Fred. W. G. Payne.

(Continued from p. 52.)

Bryophila perla. Common.

Diphthera orion. Has been taken at Calke Abbey (J. Hill).

Demas coryli. Dovedale (G. Baker). Lathkil Dale (Rev. C. F. Thornewill and Rev. R. H. Fuller).

Acronycta tridens. Barrow (Rev. G. A. Smallwood).—*A. psi*. Common.—*A. leporina*. One near Willington (W. Garneys). Stapenhill (G. Baker).—*A. megacephala*. Fairly common.—*A. alni*. Common south.—*A. ligustri*. Repton Shrubs, rare.—*A. rumicis*. Common everywhere.

Diloba cæruleocephala. Common in the south.

Leucania conigera. Bretby and Barrow.—*L. lithargyria*. Bretby and Barrow.—*L. comma*. Common.—*L. impura*. Common.—*L. pallens*. Common.

Tapinostola fulva. Bretby and Chellaston.

Nonagria arundinis, Fb., = *typhæ*, Esp. Common south.—*N. lutosa*, Hb., = *crassicornis*, Haw., Sta. Willington.

Gortyna ochracea, Hb., = *flavago*, Esp. Fairly common.

Hydrœcia nictitans. Fairly common. — *H. micacea.* Bakewell, Barrow, and Bretby.

Axylia putris. Common in the south.

Xylophasia rurea. Common. — Var. *combustata.* Breadsall (Mr. Hill). Bakewell, casually (Rev. R. H. Fuller).—*X. lithoxylea.* Common. —*X. sublustris.* Willington.—*X. monoglypha*, Hufn., = *polyodon*, L. Common. Rev. R. H. Fuller has taken the dark form at Bakewell.—*X. hepatica.* Barrow and Bretby.—*X. scolopacina.* Bretby and Ingleby.

Neuria reticulata, Vill., = *saponaria*, Bork. Repton Shrubs, Barrow, and Chellaston.

Neuronia popularis. Chellaston, Bretby, and Derby.

Charæas graminis. Common.

Cerigo matura, Hufn., = *cytherea*, Fb. Recorded once (Rev. R. H. Fuller). One at Barrow (Rev. G. A. Smallwood).

Luperina testacea. Fairly common.

Mamestra sordida, Bork., = *anceps*, Hb. Bretby and Barrow.— *M. furva.* Recorded as a Derbyshire insect by Newman.—*M. brassicæ.* Common.—*M. persicariæ.* Common south.

Apamea basilinea. Common.—*A. gemina.* Common everywhere.— *A. unanimis.* Recorded by Mr. Hill and Rev. G. A. Smallwood.— *A. didyma*, Esp., = *oculea*, Gn. Common everywhere.

Miana strigilis. Common.—*M. fasciuncula.* Occurs almost everywhere.—*M. literosa.* Bakewell, Willington, Derby, and Barrow.—*M. arcuosa.* Bakewell, Bretby, and Repton Shrubs.

Grammesia trigrammica, Hufn., = *trilinea*, Bork. Common south.

Stilbia anomala. One at Findern (W. Garneys).

Caradrina morpheus. Common throughout the county.—*C. alsines.* Bakewell and Barrow. — *C. taraxaci*, Hb., = *blanda*, Tr. Derby, Barrow.—*C. quadripunctata*, Fb., = *cubicularis*, Bork. Everywhere.

Rusina tenebrosa. Repton Shrubs.

Agrotis puta. Recorded by Mr. J. Hill.—*A. suffusa.* Fairly common in south-west.—*A. saucia.* Rare. Somershall, Willington.—*A. segetum.* Very common everywhere.—*A. exclamationis.* Common.—*A. corticea.* I have taken this moth commonly at sugar at Chellaston.—*A. nigricans.* Derby, Barrow, and Bretby.—*A. tritici.* Barrow (Rev. G. A. Smallwood).—*A. aquilina.* Rare. Bretby.—*A. obelisca.* Bred from larvæ taken at Derby (G. Baker).—*A. agathina.* Breadsall Moor (G. Baker). —*A. strigula*, Thnb., = *porphyrea*, Hb. Breadsall Moor (G. Baker). Frequent (Rev. R. H. Fuller).—*A. obscura*, Brahm., = *ravida*, Hb. Barrow (Rev. G. A. Smallwood).—*A. simulans*, Hufn., = *pyrophila*, Fb. Somershall, rare (E. Brown).

Noctua glareosa. Recorded by Mr. J. Hill and Rev. R. H. Fuller. —*N. augur.* Common.—Var. *helvetina.* Derby.—*N. plecta.* Common throughout. *N. c-nigrum.* Throughout the county.—*N. triangulum.* Bakewell and Bretby.—*N. brunnea.* Abundant.—*N. festiva.* Common south, occasionally north.—*N. dahlii.* Recorded as Derbyshire by Newman.—*N. subrosea.* One taken in 1857 (J. Hill). Once at Little

Eaton (G. Baker).—*N. rubi*, View., = *bella*, Bork. Common in the south of the county. — *N. umbrosa.* Common. — *N. baia.* Fairly common.—*N. xanthographa.* Exceedingly common everywhere.

Triphæna ianthina. Bretby, Barrow. — *T. fimbria.* Willington, Repton Shrubs, Bretby, and Little Eaton.—*T. interjecta.* Willington, Barrow. One specimen in Monsal Dale (Miss E. M. Alderson).—*T. orbona*, Hufn., = *subsequa*, Hb. Recorded from Derbyshire by Newman. — *T. comes*, Hb., = *orbona*, Fb. Common. — *T. pronuba.* Abundant everywhere.

Amphipyra pyramidea. Repton.—*A. tragopogonis.* Common.

Mania typica. Common as far north as Bakewell.—*M. maura.* Frequent south.

Panolis piniperda. Recorded by Mr. Hill.

Pachnobia rubricosa. Common.

Tæniocampa gothica. Abundant. — *T. incerta*, Hufn., = *instabilis*, Esp. Common.—*T. populeti.* Bretby, Barrow.—*T. stabilis.* Common throughout the county.—*T. gracilis.* Chellaston, Willington, Derby, and Little Eaton.—*T. munda.* Repton.—*T. pulverulenta*, Esp., = *cruda*, Tr. Common.

Orthosia suspecta. Recorded by Mr. J. Hill.—*O. upsilon.* Recorded by Mr. J. Hill and Rev. G. A. Smallwood.—*O. lota.* Chellaston, Drakelow, Repton, Bretby.—*O. macilenta.* Recorded by Mr. Hill.

Anchocelis rufina. Only taken by Mr. Hill.—*A. pistacina.* Common everywhere.—*A. lunosa.* Barrow.—*A. litura.* Common in the south.

Cerastis vaccinii. Common.—*C. spadicea.* Frequent south.

Scopelosoma satellitia. Everywhere.

Xanthia citrago. Repton and Bretby.—*X. fulvago*, L., = *cerago*, Fb. Common.—Var. *flavescens.* Occasionally throughout the south-west. —*X. flavago*, Fb., = *silago*, Hb. Abundant.—*X. gilvago.* Abundant in the south.—*X. circellaris*, Hufn., = *ferruginea*, Esp. Occurs commonly almost everywhere.

Cirrhædia xerampelina. Repton, Willington, Barrow, Derby, Dovedale.

Tethea subtusa. Barrow and Bretby.

Cosmia paleacea, Esp., = *fulvago*, Hb. Recorded as a Derbyshire moth by Newman.

Calymnia trapezina. Common south.—*C. pyralina.* Derbyshire (Newman).—*C. diffinis.* Etwall.—*C. affinis.* Derby, Bretby, and Barrow.

Dianthœcia capsincola. Barrow.—*D. cucubali.* Bakewell, recorded three times (Rev. R. H. Fuller). I have taken one specimen at Chellaston.—*D. carpophaga.* Common at Bretby.

Polia chi. Common, Bakewell (Rev. R. H. Fuller). Barrow (Rev. G. A. Smallwood). Little Eaton, common (G. Baker). Near Ashbourn (H. T. Gibson). Bakewell, common (Rev. C. F. Thornewill).—*P. flavicincta.* Derby.

Dasypolia templi. Milford, at light, by Mr. G. Pike; and Derby, at light, by Mr. G. Baker.

Cleoceris viminalis. Recorded by Rev. G. A. Smallwood and Mr. Hill.

Miselia oxyacanthæ. Occurs everywhere.—Var. *capucina.* Occasionally in the south-west.

Agriopis aprilina. Common in the south, but Rev. R. H. Fuller has only four records at Bakewell, and Mr. Hooke three at Eckington.

Euplexia lucipara. Common in southern and central districts.

Phlogophora meticulosa. Abundant everywhere.

Aplecta prasina, Fb., = *herbida*, Hb. Occasionally south of Bakewell.—*A. occulta.* Once at Drakelow (G. Baker). Three at sugar at Bretby, 1881 (T. Gibbs). Also recorded by Rev. G. A. Smallwood and Mr. J. Hill.—*A. nebulosa.* Common south.

Hadena adusta. Frequent at Bakewell. Willington. — *H. protea.* Fairly common.—*H. glauca.* Wirksworth (Mr. Hill).—*H. dentina.* Common.—*H. trifolii*, Rott., = *chenopodii*, Fb. Stapenhill.—*H. dissimilis*, Kn., = *suasa*, Bork. Repton Shrubs, Derby, and Barrow.—*H. oleracea.* Common in the south of the county.—*H. pisi.* Bretby, Repton, Little Eaton.—*H. thalassina.* Common south, rarer north.

Xylocampa areola, Esp., = *lithoriza*, Bork. On sallow blossoms (W. Garneys).

Calocampa vetusta. Bretby.—*C. exoleta.* Willington, Bretby, and Barrow.—*C. solidaginis.* Recorded once (Rev. R. H. Fuller). Also recorded by Mr. Hill.

Asteroscopus sphinx, Hufn., = *cassinea*, Hb. On lamps on Burton Bridge (E. Brown). Larvæ at Bretby (Rev. C. F. Thornewill).

Cucullia verbasci. Ticknall, Derby, and Newton Solney.—*C. chamomillæ.* Larvæ at Willington (W. Garneys).—*C. umbratica.* Common.

Gonoptera libatrix. Abundant south, occasionally north.

Habrostola tripartita, Hufn., = *urticæ*, Hb. Common.—*H. triplasia.* Common south, frequent at Bakewell.

Plusia chrysitis. Common everywhere.—*P. festucæ.* Derby and Barrow.—*P. iota.* Common.—*P. pulchrina.* Common everywhere in the county.—*P. gamma.* Common throughout.—*P. interrogationis.* Records exist of its occurrence in Derbyshire (Newman).

Anarta myrtilli. Breadsall.

Heliaca tenebrata, Scop., = *arbuti*, Fb. Barrow and Breadsall.

Heliothis dipsaceus. Once at Breadsall (G. Baker).

Chariclea umbra, Hufn., = *marginata*, Fb. Breadsall.

Phytometra viridaria, Clerck., = *ænea*, Hb. Derby and Bakewell.

Euclidia mi. Dovedale.

Brephos parthenias. Repton Shrubs. Reported (Rev. R. H. Fuller).

(To be continued.)

NOTES ON THE SYNONYMY OF NOCTUID MOTHS.

By Arthur G. Butler, Ph.D., F.L.S., &c.

(Continued from vol. xxvii. p. 267.)

Poaphila vinculum.

♂ *Phurys vinculum*, Guenée, Noct. 3, p. 504, n. 1758 (1852).
♂ *P. lima*, Guenée, *l. c.*, n. 1759 (1852).
♂ *Poaphila obversa*, Walker, Lep. Het. xiv. p. 1473, n. 14 (1857).
♂ *P. dissocians*, Walker, *l. c.*, p. 1477, n. 23 (1857).

United States, Georgia, Texas. In Coll. B. M.

Walker identified certain examples of this species with Guenée's *Poaphila herbarum*, and the specimens which he recognized as *P. vinculum* are probably faded examples of *P. sylvarum*. The two supposed species *P. vinculum* and *P. lima* differ less than the sexes; *P. lima* is a male form, in which the outer transverse stripe is more than usually sinuous, and both stripes have more than usually dark diffused external borders.

Poaphila iniqua.

♀ *Nymbis iniqua*, Guenée, Noct. 3, p. 321, n. 1784 (1852).
♂ *Celiptera? infecta*, Walker, Lep. Het. xiv. p. 1847, n. 2 (1857).
♀ *Mocis? refracta*, Walker, *l.c.*, p. 1488, n. 2 (1857).
St. Domingo. In Coll. B. M.

Poaphila bistrigata.

♂ *Geometra bistrigata*, Hübner, Exot. Schmett. Zutr., figs. 111, 112.
Poaphila herbarum, Guenée, Noct. 3, p. 303, n. 1757 (1852).
United States. Female in Coll. B. M.

Guenée says of his *P. herbarum* that it is very close to *bistrigata*, but it is larger, less brightly coloured, and has the second line regularly arched instead of slightly sinuous. It is characteristic of the species that the yellow border to the second line is outside instead of inside it. Guenée's distinctions are trivial and valueless. Walker identified specimens of *Phurys immunis* as *Poaphila bistrigata.*

FODINA, *Guen.*, and COLBUSA, *Walk.*

These two genera are so similar in colouring, pattern, and form, that they have been confounded in collections. *Fodina* has long upcurved palpi, and will include the following species:—*F. oriolus*, *pallula*, and *stola*, *Athyrma albicincta*, Walk., *F. sarmentosa*, *ostorius*, and *euclidicola*, with their allies, and *Trigonodes cuneigera*, Butl.

Colbusa will take *C. euclidica*, *Grammodes conjungens*, *G. mygdon*, *G. delta*, and their allies. In this genus the third joint of the palpi is very short.

I think it very doubtful whether *Sarrothroceras*, Mabille, can be structurally distinguished from *Fodina;* but, at present, we only have the female of his typical species.

The genus *Calyptis* should, in my judgment, stand next to *Colbusa* (it is certainly not a Plusiid), and should be followed by *Cabralia*, Moore.

Phurys biangulata and *Trigonodes obstans* may be placed under *Heteropygas*, Guen., to which genus I think *Pelamia* must be allied; but I only know the latter from Guenée's figure.

TRIGONODES, *Guen.*

The number of species made out by Guenée is extraordinary, seeing how little the much divided *T. hyppasia* varies:—

Trigonodes hyppasia.

Phalæna hyppasia, Cramer, Pap. Exot. 3, p. CCL, E. (1782).
Ophiusa anfractuosa, Boisduval, Faune Ent. de Madag. p. 104, n. 8, pl. 15, fig. 6 (1833).
Trigonodes acutata, Guenée, Noct. 3, p. 283, n. 1728 (1852).
T. inacutata, Guenée, *l. c.*, p. 284, n. 1729 (1852).
T. exportata, Guenée, *l. c.*, n. 1730 (1852).
T. compar, Walker, Lep. Het. xiv. p. 1451, n. 9 (1857).
Chalciope mahura, Felder, Reise der Nov. Lep. iv. pl. cxvii. fig. 13.
C. deltifera, Felder, *l. c.*, fig. 24.
Asia, Africa, and Australia. In Col. B. M.

It is absolutely impossible to distinguish any of the above supposed species when one possesses a good series of specimens.

Trigonodes cephise.

♂ *Phalæna cephise*, Cramer, Pap. Exot. 3, p. 59, pl. ccxxvii., fig. c (1782).
♀ *Trigonodes maxima*, Guenée, Noct. 3, p. 282, n. 1723 (1852).
♂ N. India, ♀ E. India, ♂, ♀ Moulmein and Fiji. In Coll. B. M.

Though apparently very dissimilar, if the sexes of this species are carefully compared on both surfaces, it will be seen that the actual differences are unimportant, and only such as one often finds in the Lepidoptera as distinctive markings between the sexes. It must, however, be insisted on that males and females from the same locality be compared; since, in widely distant localities, I find the colouring of the under surface somewhat modified, our Fijian specimens being redder below than those of India.

Trigonodes lucasii is unknown to me, but hardly seems (from the description) to belong to this genus.

My *Euclidia consors* must sink as a synonym of Lederer's *E. dentata*, from which it only differs in the slightly wider blackish submarginal band on the secondaries. When I described the Japanese insect, *E. dentata* was not in our collection, but Zeller's series includes a specimen from Siberia.

I agree with Felder in the opinion that *Drasteria* is nearly allied to *Euclidia* (Grote places both genera in the Catocalinæ, but I cannot follow him, for they seem to me much better placed near *Remigia*, placed by him in his Toxocampinæ). As already noted, *Toxocampa* does not belong to the Quadrifidæ, and therefore can have nothing in common with *Remigia* and allies.

DRASTERIA, *Hübn.*

This genus is very nearly allied to *Remigia;* it, however, has less slender and compressed palpi. The typical species, *D. erechtea*, is widely distributed and very variable, so that it could hardly escape being described several times over.

Drasteria erechtea.

♂ *Phalæna erechtea*, Cramer, Pap. Exot. 3, p. 149, pl. cclxxv., E (1782).
♀ *Drasteria erichto*, Guenée, Noct. 3, p. 290, n. 1736 (1852).
Microphysa sobria, Walker, Lep. Het. xii. p. 835, n. 6 (1857).
Poaphila patibilis, Walker, *l. c.*, xiv. p. 1471, n. 11 (1857).
P. narrata, Walker, *l. c.*, p. 1474, n. 17 (1857).
♂ *Remigia impressa*, Butler & Druce, Cist. Ent. v. p. 117 (1872); Butler, Lep. Exot. pl. lxi. fig. 19 (1874).

Canada, United States generally, and Costa Rica. In Coll. B. M.

Most of the specimens recorded by Walker had no labels of any kind upon them; in fact, the following were the only specimens bearing localities of those placed under *D. erechtea:*—Two from Trenton Falls, two from Nova Scotia, and two labelled "N. Y." All the others Walker must have guessed at, since they had never been ticketed with either register-number or locality, and consequently were so much useless lumber. As it is, we now have an immense series of specimens with localities.

REMIGIA, *Guen.*

In spite of the fact that this genus and *Drasteria* were placed in different families by M. Guenée, they are so closely allied that I consider their distinctness doubtful.

Remigia archesia.

♀ *Phalæna archesia*, Cramer, Pap. Exot. 3, pl. cclxxiii. figs. F, G (1782).
♂ *P. virbia*, Cramer, *l. c.*, fig. H (1782).
♀ *Remigia mayeri*, Boisduval, Faune, Ent. de Madag. p. 104 (1833).
♂ *R. pellita*, Guenée, Noct. 3, p. 19, n. 1780 (1852).
♀ *R. gregalis*, Guenée, *l. c.*, p. 320, n. 1782 (1852).
R. mutuata, Walker, Lep. Het. xiv. p. 1505, n. 15 (1857).
R. jugalis, Walker, *l. c.*, n. 16 (1857).
♂ *Hypætra diffundens*, Walker, *l. c.*, Suppl. 3, p. 963 (1865).
♀ *Remigia associata*, Walker, *l. c.*, p. 1010 (1865).
R. inconcisa, Walker, *l. c.*, p. 1013 (1865).
♂ *R. bifasciata*, Walker, *l. c.*, p. 1014 (1865).

Asia and Africa. In Coll. B. M.

R. demonstrans, Walk., from the Navigators' Islands, and *R. discrepans*, Butl., from Fiji, are local forms, both differing from *R. archesia* in having the inner line of the central area of primaries perpendicular instead of oblique (if anything, the direction is from inner margin obliquely outwards to costa); the two latter differ chiefly in colouring, and may prove to be one species. Walker recorded four examples from the Navigators' Islands, one of which was a mere wreck, unfit for any collection; and a second specimen equally bad, and labelled "Cent. Ind.," which was, of course, *R. archesia*.

The species into which the abundant and widely distributed *R. repanda* have been split up, simply represent an instance of what has been aptly called "sorting marbles"; all specimens in which a line has faded out have been placed under one name, and all the varying shades have been carefully matched under other names. The fact that the most distinct of the various named sports constantly come together in the same collections, appears not to have raised a question as to their distinctness as species in the minds of their describers, or their successors; indeed, Guenée indignantly says:—"On a confondu la *Latipes* avec la *Repanda* de Fabricius, qui m'en parait distincte; c'est de la première que parle M. Boisduval dans son *Genera*, p. 170, quand il cite les pays différents qu'il lui assigne pour patrie, ainsi que M. Duponchel, qui, dans son Catalogue, ne fait guère que répéter, de confiance, l'assertion de M. Boisduval. Ni l'un ni l'autre ne parait avoir distingué la véritable *Repanda*, qui semble habiter exclusivement les Antilles."

On looking at M. Guenée's description of *R. repanda*, it is amusing to note the following observation:—"Je n'ai vu que des femelles. Je ne connais pas le mâle, qui doit avoir beaucoup de rapports avec celui de la *Megas*." How far this belief was confirmed will be seen by referring to Walker's catalogue under *R. latipes*, where a male from S. Africa, indistinguishable from St. Domingo males in our collection, is recorded. The type of Walker's *R. conveniens*, from the Congo, belongs furthermore to the form recognized as *R. repanda* by M. Guenée. Hübner's figure, quoted by M. Guenée, is either incorrect, or it represents a distinct species, the undulation of the subbasal line (extra-basilaire) being unlike that of any *Remigia* known to me. It is tolerably certain to be incorrect.

Remigia repanda.

Noctua repanda, Fabricius, Ent. Syst. 3, 2, p. 49, n. 133 (1793).
Remigia latipes, Guenée, Noct. 3, p. 314, n. 1774 (1852).
Ophiusa delinquens, Walker, Lep. Het. xiv. p. 1423, n. 11 (1857).
Remigia disseverans, Walker, *l. c.*, p. 1495, n. 3 (1857).
R. persubtilis, Walker, *l. c.*, p. 1497, n. 7 (1857).
R. mensuralis, Walker, *l. c.*, p. 1499, n. 9 (1857).

R. exscindens, Walker, *l. c.*, p. 1500, n. 10 (1857).
R. subtilis, Walker, *l. c.*, p. 1501, n. 11 (1857).
R. conveniens, Walker, *l. c.*, p. 1507, n. 19 (1857).
R. detersa, Walker, *l. c.*, Suppl. 3, p. 1012 (1865).
R. munda, Walker, *l. c.*, p. 1020 (1865).
Baratha acuta, Walker, *l. c.*, p. 1022 (1865).
Remigia indentata, Harvey (see Grote's Check-List, p. 41, n. 1276).

Madagascar, Africa, Arabia, N. and S. America. In Coll. B. M.

The sports of this species represent about four ill-defined types, with their intergrades.

(1.) *R. repanda*, typical (we have it from Jamaica); represented also in the Museum series by *R. latipes!* from Madagascar, the Congo, Aden, Sao Paulo, and St. Domingo (*R. persubtilis*).

(2.) *R. subtilis*, Walker, = *indentata*, Harvey, a dark variety, from Rodriguez, S. Africa, the Congo, Abyssinia, Aden, Rio Janeiro, Goya, Surinam, Pará, Santarem, St. Domingo, Venezuela, Jamaica, Chontales, and the United States.

(3.) A variety intermediate between 1 and 2 = *R. conveniens*, Walk., from the Congo, Sierra Leone (*R. detersa*), Aden, Rio Janeiro, Sao Paulo, Surinam, St. Domingo (*R. exscindens*), Honduras (*Baratha acuta*), and East Florida (*R. disseverans*).

(4.) Lastly, a reddish variety, rather more distinct than the other three, though linked by intermediate grades to (2), from Honduras = *R. mensuralis;* we have this also from the Congo, Aden, Espiritu Santo, St. Domingo, and Trinidad.

All the four types, therefore, with their intergrades, occur constantly together, and there can be very little doubt that they represent one widely-distributed, abundant, and variable species. It is, of course, very probable that the above synonymy will have to be added to when other named forms (at present unknown to me) come to hand.

(To be continued.)

ABERRATIONS IN THE STRUCTURE OF APPENDAGES IN THE COLEOPTERA.

By T. H. Garbowski, Ph.D., J. U. C.

Although the Arthropoda generally provide an immense amount of material to the student of Teratology, nothing is more interesting than the occasional instances of abnormal limb-development. In the following note I have described two interesting cases, the first of which—a male of *Lucanus cervus* var. *capreolus*—shows a hypertrophical multiplication of the antennæ; the second is an instance of atrophy in the right hind foot of *Hygrocarabus variolosus*.

The *Lucanus* has the left antenna (Fig. I.) trebly branched instead of single as in the type. There is a single normal scape (*sc*) as in the right antenna (Fig. II.), but it is considerably shorter, shows less curvature on the outer border, and the proximal portion is slightly thicker; while it is less hairy on the club-shaped farther part, which at the extremity is bare. The hypertrophy commences at the next joint—the pedicellus—*2* in our figure, from which springs a branch turning outwards (*a*), the pedicellus being continued as the main axis (*b*). The joint next to the pedicellus (*3*) carries the third branch (*c*), which turns inwards in the direction of the insect's head.

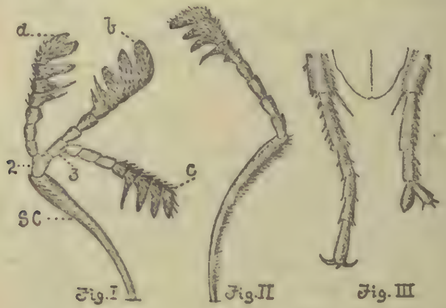

Fig. I Fig. II Fig. III

From the pedicellus to the end, the normal antenna consists of eight joints, the first three of which are cylindrical; the remainder, being flattened, form the fan. In this aberration the rounded shape of the pedicellus and the next joint is altered to T-form by the growing out of the branches, and a deep trough-like depression marks the borders of both offsets, so that a transverse section would be biscuit-shaped instead of round. These two joints are also much stronger and thicker than in the normal antenna.

The three joints intermediate between the fans and the pedicellus do not show any noteworthy departure from the type on either of the branches, and the fans, except in one instance, do not exhibit more than ordinary divergences from the normal form. The outermost branch of the left antenna has the tubercle on the fifth joint very strong. The first two joints of the fan are like those of the other branches and the right antenna, but the third lamella is much more fully developed, and carries some sharp barbs or spines. The two final joints also are very strong, but what is in the highest degree remarkable, they form a solid block, as it were, instead of being divided into two separate segments.

The lamellæ of this thrice-branched left antenna appear to have been originally turned downward, whereas the leaves of the normal fan are directed toward the shoulder part.

The specimen was found by Prof. Grobben in the entomological collection of the II. Zoological Institute of the University of Vienna. The locality is unknown.

The second case is in the right foot of the third pair of legs of *Hygrocarabus variolosus* (Fig. III.). The normal left tarsus is composed of five joints, of which the proximal final joint with the claws is longest; the second is shorter by nearly one-half than the first; the third and fourth still shorter. All the joints are cylindrical, slender, and narrower at the base, with spines at the distal end. The basal, and partially also the next joint, have longitudinal rows of soft pointed spines. While the femur and tibia of the right foot correspond in the length and arrangement,—with the exception of the stronger distal incrassation and the longer inner ray of the tibia,—with the same parts of the normal foot, the tarsus, on the contrary, is reduced by three joints. The two first joints are longer and stronger than usual, but they are less hairy than those of the left foot. The last joint is quite flattened, heart-shaped, somewhat hollowed beneath, and divided into two flaps, which reminds one of an uncus. The claws spring from the terminal border of one of the flaps.

This example came from the Plateau of Podolia.

The recorded cases of supernumerary antennæ in insects are enumerated and considered in Bateson's 'Materials for the Study of Variation'; Dr. Garbowski's individual appears to come in Bateson's category of "extra antennæ arising together." The whole of the cases enumerated by Bateson under this category are Lamellicornia. Dr. Garbowski's case is that of a Pectinicorn, and is extremely interesting from the strong evidence it offers—as we shall hereafter explain—of the exact nature of the aberration, or variation, as Bateson prefers to call these departures from the usual. It has been customary to look on similar cases as "freaks of nature," and it has been one of the great merits of Bateson's work that he has shown that these curious freaks are evidently subject to law, for they display remarkable symmetry, and are found to be in many respects normal in their abnormalities. Dr. Garbowski's case shows in a very interesting manner the preservation of the usual number of joints in the unnatural parts, and also their presentation of a new symmetry, the organs introduced as supernumerary on the left side of the body being not repetitions of left-sided organs, but a pair—right-hand and left-hand.

Asking the reader to refer to Fig. I., where the unusual structures described are figured, it will be gathered that they are placed on the left side of the body. Fig. II. represents the natural antenna of the right side of the body, to which the triple structure (Fig. I.) corresponds, or rather replaces, on the left side of the individual. There are three incomplete antennæ (*a*, *b*, *c*), each of which, however, is rendered complete by parts (*sc*, *2*, *3*), which are common property, as it were, of itself and of one or both of the other incomplete antennæ. If the joints, commencing at each of the three outer extremities and going to the base of the whole, be counted, it will be found that *a* and *b* have each ten joints, while *c* has eleven. There being three antennæ on one side of the body, two of them are, of course, in excess of what is natural. If we look at the three we note that *c*, if placed erect, is a left-hand antenna, and thus, taken in conjunction with the antenna of the other side of the body, forms a natural pair. The reverse of this is the case with *b*, which it will be noticed is a right-hand antenna, though placed on the left side of the body; this antenna is therefore clearly unnatural: *a* is again, like *c*, a left-hand antenna, and if *b* and *c* were taken away it would form, with the antenna on the other side of the body, a natural pair. It would thus appear that either the pair *a b* or the pair *b c* is supernumerary. There are, however, certain facts that create a strong presumption that the pair *a b* are really parts added to a normal antenna, *c*. We have seen that *b* is certainly an interpolation; now, as *a* pairs with it, we may conclude that *a* is the fellow of *b*, and *b* being an interpolation, it is probable that *a* is also such. This presumption is supported by the numbers of joints in the three organs. The natural number of joints in a normal antenna of *Lucanus cervus* is ten. As we have already mentioned, *a* and *b* agree together in having ten joints, of which *sc* and *2* are common to both; *c*, however, has, if we count the joint *2* as belonging to it, eleven joints, or one more than is natural in *Lucanus*. But the joint *2* is the common property of *a* and *b*, and if we do not count it as forming any part of *c*, then the latter has the natural number of joints, ten. Thus, if we take it that the pair *a b*, including their common joint *2*, is an interpolation between two joints of the normal antenna, *sc*, *c*, there is clearly much in favour of our assumption. There is a further piece of evidence that *c* represents the normal left antenna, for if its club be looked at it will be seen that, like the club of the natural antenna on the other side of the body, it consists of four joints; so that the two pair with one another in this respect: *a* and *b* have each five joints in the club, so that they pair with one another in this respect, but do not agree with either *c* or the natural antenna.

Several other points of interest are suggested by this remarkably perfect monstrosity, but in the absence of a minute examination of the specimen—which we understand is the property of an institution in Vienna—it is impossible to form an opinion about them. We may, however, remark, in connection with the number of joints in the club, that this character is subject to variation in *Lucanus cervus*, though it is the rule that some of the departures from the normal are only found in certain localities. It is therefore interesting to observe that the intercalated pair of antennæ is not, as regards the club, conformable with the natural antenna of this individual, being, in fact, five-jointed instead of four-jointed. We have, in fact, the antennæ of one variety added to those of an individual that itself is of a different variety; just, as we have already seen, we have in the case of *b* a right-hand structure formed on the left-hand side of the body.

It is seen from our figure that the joint *2*, which is the common property of two antennæ, is evidently a double joint. Now, as the scape, *sc*, is the common property of three antennæ, it would be interesting to examine whether it bears any trace of a triple structure; it is evidently thicker than natural, but this may only be due to its having a thicker joint *2* than is natural. The structure of the joint *3* is amongst the most peculiar of the questions that are suggested: according to the view we take it is part of *b* and *c*, right-hand and left-hand structures. Is it a double joint, and is one side of it left-hand, the other right-hand? —D. SHARP.

NOTES AND OBSERVATIONS.

NOTE ON APORIA CRATÆGI.—Referring to the occurrence of this species in open places rather than woods, Mr. W. Warde Fowler, in 'Nature' (No. 1320), says that in the years 1857–1859 he used to find it "tolerably abundant" on a common about a mile and a half to the west of Cardiff. This common was quite an open one, without any adjacent woodland and very little hedge timber. In No. 1321 of the same periodical Mr. Goss states that he met with the species "in abundance in the New Forest in 1866, 1868, 1869, and 1870." He adds, "It rarely occurred in or near dense woods, but preferred the open heaths and wastes of the Forest, where thistles were plentiful. In 1867 I found the species swarming, about midsummer, in hay-fields on hill-sides in Monmouthshire. There were a few small orchards, but not much wood in the neighbourhood."

RE A HUNT FOR PHORODESMA SMARAGDARIA.—Having just received the March number of the 'Entomologists' Monthly Magazine,' and read Mr. Auld's description of a hunt for *P. smaragdaria*, I am simply amazed to think that in these matter-of-fact times we should have a veritable Rip van Winkle arise in our midst to tell us this old story, which we all knew so well, *as something new*. Or is it that we live in such very fast times, that the discovery of this particular larva about eight years ago, when its whole history was made known, has already become ancient history, and the true facts lost in the dim past? that we are treated to this mythical, and not very elevating anecdote, of the "beetle-catcher and his friend," which, I need hardly say, existed only in the imagination of the narrator. The memory of my late friend (Mr. Machin) alone induces me to notice Mr. Auld's absurd statement, and to inform him that the correct account is to be found in the

'Entomologist,' vol. xvii. p. 235; also in the 'Transactions' of the Entomological Society of London, October, 1886; and if he reads them carefully, I think he will come to the conclusion that his disparaging "story" (as he calls it) of one of our best practical field entomologists, only so recently passed from us, is at the present time particularly ill-chosen, and shows, to say the least of it, very bad taste. --Geo. Elisha; 122, Shepherdess Walk, City Road, March 1st, 1895.

Izal and Relaxing Boxes.—During last season I made the discovery that a small quantity of "Izal"—which is a disinfectant produced from the fumes of coke ovens—poured into a zinc relaxing-box, and allowed to stand for a few hours, admixed with water, entirely prevents the growth of mould. I found I could keep insects in a relaxing-box occasionally treated in this way, in a suitable condition for setting, from five to seven days; further, that a number of insects which I had left in a relaxing-box so treated, and forgotten for over six weeks, had not a trace of mould about them at the end of that time, but when handled, presented a similar appearance to that produced by squeezing between the fingers a bit of rotten vegetable matter. I confirmed this by subsequent experiments. Perhaps some of your readers, who occasionally find themselves compelled to keep insects relaxed for a few days, might feel inclined to try this, and I should be glad to know if their experience tallies with mine.—W. Tunstall; Meltham, near Huddersfield.

The late Mr. Machin's Sale.—The answer to Juliet's query may possibly be found in the result of the sale of the late Mr. Machin's collection at Stevens's on the 26th of last month. It would savour of impertinence on the part of the writer to say that Mr. Machin was a well-known lepidopterist; few of us, indeed, interested in this group but have had more or less direct personal communication with him. It was therefore with feelings of considerable interest that I went to look over the collection before its dispersal. The first thought that occurred to me was that it had been very much over-catalogued; and although a subsequent and more careful inspection tended somewhat to modify first impressions, there is little doubt that whoever undertook this portion of the work did take a somewhat roseate view of his duties. Notwithstanding this, and the more than perceptible trace of mould exhibited, it must be conceded that the prices obtained were exceedingly stiff, and in many instances reached high-water mark. As far as I am aware, £4 10s. for a single specimen of *Noctua subrosea* (which doubtless now graces the Tring museum) is a record, any way, for auction prices of this species. Altogether the Macro-Lepidoptera realised between £350 and £360, a result very comforting to the deceased's representatives, especially if it is the fact, as I have been informed, that the whole collection was offered to the Brighton museum for £220. To go into particulars:—Lot 7, which fetched 32/6, as per catalogue, included a pale form of *Euchloë cardamines*, and also a curious variety. The first was a faded male, very old, the colour due only to fading, as the base of the wings exhibited a smoky brown instead of the usual clear grey of fresh specimens; the "curious variety" was a very poor specimen, and apparently the orange had been removed from the right side, as a few orange scales remained. Both this wing and the secondaries were much stained. Lots 10 and 11, which realised £1 12s. 6d. and £2 2s., each contained a really nice variety of *Argynnis paphia*. The first was a fine and perfect female with unusually conspicuous blotches on the under surface of the primaries, having on the central portion of each wing a large black blotch. The other variety was also a fine female with marginal and submarginal spots forming a series of black bars. Lot 15, £3 10s., was described as a magnificent variety of *Vanessa cardui*. It was only a fair variety, and required some examination before one detected that the largest costal white blotch was almost absent; otherwise it was a normal specimen. Lot 16 was a var. of *Apatura iris*. The specimen was a small male with yellowish under wings, due principally, in my opinion, to dwarfism caused by bad rearing, and was very dear at £3 5s. There were five specimens of *Polyommatus dispar*, which fetched £2, £4 8s., £3, £3 10s., and £5 5s.; also an under side, a doubtful specimen, looking much like the var. *rutilus;* this fetched £3 5s. Lot 29 contained a fine variety of *P. phlœas*, perhaps the finest example of the blue spots forming a conspicuous blue bar I have seen; it realised £3 10s. Five *Lycæna acis* fetched about £1 each, and a series of nine *L. arion* from Barnwell Wold £2 10s. One *Deilephila euphorbiæ* from Mr. Thomas Boyd, 28/–, and eight *D. galii*, from Mr. Tester and Mr. Sidebotham, £3 17s. 6d. the lot. A specimen of *Sphinx pinastri*, bought by Mr. Bond out of Waile's cabinet, fetched 30/–. Lot 46, containing twenty-nine ordinary clearwings, fetched £3. Two lots of three and two *Sesia scoliiformis* fetched £1 15s. and £2 2s.; *S. sphegiformis*, for two and four specimens from the usual locality, bringing 20/– and £2 5s. An orange *Zygæna trifolii*, with other nice forms, cost £3 10s.; whilst a parti-coloured *Z. filipendulæ*, with five *Nola albulalis*, fetched £2 10s. Five *N. albulalis*, with the same number of *N. centonalis*, fetched 27/6; the next lot, consisting of six of the latter, bringing 30/–. The vars. of *Arctia caia* were very ordinary, and the prices realised for lots of four, four, three, and two, *viz.*, 12/–, 40/–, 42/–, and 21/–, looked very much as if some one had an open commission to execute. Lot 76, nine specimens of *Ocneria dispar*, was described as a fine series of the old fen form—one black var. Here we have the usual error; the black var. itself is the old fen form, the other brown specimens being the common form. There were ten *Lælia cænosa* from Wicken Fen, sold in pairs, the prices being 35/–, 37/6, 27/6, 40/–, and 42/–. Eight *Lasiocampa ilicifolia*, from Mr. Bonny, also sold in pairs, and being in perfect condition, cost £2 5s., £4 5s., £3 3s., and £3; whilst pairs of *Drepana sicula* brought 18/–, 22/–, 24/–, 32/6, and 22/–. Ditto of *Dicranura bicuspis*, from Tilgate, 26/–, 30/–, and 27/6. Eight *Notodonta dictæa* and eleven *N. dodonea* brought £2, whilst nine *N. dictæoides* and ten *N. chaonia* 30/–. *Cymatophora fluctuosa* and *C. ocularis*, four each, 30/–; four *C. fluctuosa*, with others, 32/6; four *C. ocularis*, with others, only 12/–. A pair of *Leucania albipuncta*, with a history, £2; a single specimen, with four *Nonagria brevilinea*, including two vars. *alinea*, only 18/–. A nice series of *Senta ulvæ*, and others, £2 10s.; and pairs of *N. sparganii* and *Xylomiges conspicillaris*, the latter from the Rev. Horton, 30/– and 21/– respectively. Three *Crymodes exulis* an average of 26/– each. The *N. subrosea* obtained record prices: the first two pairs fetched £4 and £5 5s.;

Lot 157, a single female, £4 10s.; whilst the last pair, from Lord Walsingham, and which the writer considered the pick of the lot, he obtained for £4 5s. A nice series of six *Polia nigrocincta* fetched £2 5s.; whilst eight good *Dianthœcia albimacula*, and a beautiful form of *Polia chi* var. *olivacea*, with others, brought only 5/–. Eight good *Xylina conformis* went Doverwards for £3 7s., whilst the nine *Cucullia gnaphalii* were purchased by one gentleman for £8 10s. A *Catocala fraxini*, from Mr. Edmunds's collection, realised 20/–. Some nice *Amphidasys betularia*, including a rather worn buff var., 30/–. Pairs of *Cleora viduaria* 35/–, 65/–, and 55/–. In the emeralds Mr. Machin was unusually strong. A beautiful banded var. *Pseudoterpna cytisaria*, with five *Phorodesma smaragdaria*, bred by Mr. Machin from Fobbing, Essex, fetched £2; another five of the latter insect, with *Nemoria viridata*, went for 26/–. The *Acidalia* "*circellata*" were, in my opinion, poor, and very much like (what, by the way, they actually are) *A. straminata*, and fetched something like 10/– each. The *Phibalapteryx polygrammata* fetched 11/– each, a result which must make some of our older collectors,—with whom, I understand, this species used to be more or less of a pest, owing to its numbers,—regret they did not accept their opportunity.—T. W. Hall.

Caradrina superstes, Tr., as a British Species.—As Mr. South's list of recent additions to our British Lepidoptera (Entom. xxvii. 342) has brought the question of the occurrence of the above-named species in this country before the readers of the 'Entomologist,' and as my friend Mr. Hodges has mentioned my name in connection with the subject (Entom. xxviii. 17), I think it will be well to state that I have been thoroughly sifting the question, and that I have to retract my hasty expression of opinion, upon which Mr. Hodges based his note. Mr. Tutt had erroneously referred the Guernsey and Isle of Wight species (i. e., *ambigua*) to *superstes*, and it was on discovering this that I made the statement in question; but on investigation it appears that Mr. Tutt does possess the true *superstes* from Deal, and, therefore, that Mr. South's addition of the species to our fauna may stand. In a paper which I read last night before the City of London Entomological Society, I pointed out that Dr. A. Speyer has shown (Stett. Ent. Zeitung, xxviii. 73, &c.) that the male antennæ of *superstes* differ so entirely from those of *ambigua*, that no confusion between the two is possible. It also seems that *superstes* is quite specifically distinct from *taraxaci*, Hb., with which Guenée doubtfully unites it as a variety.—Louis B. Prout; 12, Greenwood Road, Dalston, N.E.

Collecting in Switzerland.—I intend to go to Switzerland in June, for about a fortnight's collecting of Lepidoptera, and should be very glad of any information as to the best place to make my head quarters, or two places for one week at each.—J. Hamilton Leigh; Brinnington Mount, Stockport.

CAPTURES AND FIELD REPORTS.

Xanthia ocellaris, Bork., near London.—On October 3rd, 1894, I captured at West Dulwich, on a gas-lamp near the College, a *Xanthia* which

I believe is to be referred to this species. Unfortunately, the specimen is rather worn, but seems to agree with the continental examples of *ocellaris* at the Natural History Museum. I do not think that *gilvago*—the species from which *ocellaris* seems to be separated only with difficulty—occurs here; but perhaps some reader of the 'Entomologist' can supply information on this point.—T. B. Fletcher; 78, Thornlaw Road, West Norwood, S.E., Feb. 3rd, 1895.

[Three specimens of *Xanthia ocellaris* were recorded as taken in Britain in 1893—one by Mr. Taylor at sugar on Wimbledon Common, September 27th; and one each by Prof. Meldola and Mr. Boscher, in the autumn, also at sugar, in the garden of Belle Vue House, Twickenham. All these specimens were of the form known as var. *lineago* (*vide* E. M. M. xxx. 161). *X. gilvago* ranges in colour from deep orange, with well-defined dark markings (sometimes suffused with dark greyish), to pale yellow with faint markings; and examples of the latter form are sometimes mistaken for *X. ocellaris*, but this last species is distinguished by its more pointed fore wings and a white dot below the reniform stigma.—Ed.]

Charæas graminis in Staffordshire.—My experience of *C. graminis* differs in some respects from that of Major Still (*ante*, p. 11). I used to take the insect frequently on Cannock Chase, when living at Burton-on-Trent. I found them at all hours of the day, but particularly during the afternoon, sitting on the flowers of the ragwort, from which I was able to box them without using the net. But these were almost invariably males, and were taken about a fortnight earlier than the date Major Still mentions, *viz.*, about the beginning of August, or even late in July. I never saw anything like the abundance described by Newman, or by your correspondent. The males have been taken freely at light by my friend Mr. R. Freer, of Rugeley, in the porch of his house, which is about a mile and a half distant from the nearest part of the Chase.—(Rev.) Chas. F. Thornewill; Calverhall Vicarage, Whitchurch, Salop, January, 1895.

Notes from Paignton, S. Devon.—I recorded (*ante*, p. 59) the capture of several *Heliophobus hispida*. This should have been *H.* (*Neuronia*) *popularis* in all cases.—C. M. Mayor; Jan. 30th, 1895.

The Illuminated Moth-trap.—A year having elapsed since I sent you an account of the working of my moth-trap (Entom. xxvii. 55), I send you a list of species captured during 1894, which had not previously been taken; and also of a few additional specimens of species which are rare, or of which I had only been able to chronicle the capture of one or two examples. Most of the species previously mentioned occurred again, but it is curious to note how certain species, which seem to occur more or less plentifully one year, are entirely absent, or comparatively scarce, another, and vice versâ; for instance, during 1894 the following, which occurred in 1893, were entirely absent, viz.:—*Notodonta trepida, Demas coryli, Agrotis segetum, A. corticea, A. tritici, Noctua plecta, N. umbrosa, Xanthia aurago, Aplecta nebulosa, Epione apiciaria, Cleora glabraria, Cidaria miata, C. fulvata, Botys asinalis, Leptogramma literana, Retinia pinicolana, Xanthosetia hamana, Epigraphia steinkellneriana.* With the exception of *Agrotis segetum, Xanthosetia hamana* (which I took in plenty on Riddlesdown near Purley), and *Cleora glabraria* (of which I took a female in the New Forest), I did not see any of the above at all during 1894. To set against this I took the following species new to my list:—*Vanessa* *cardui* (on Aug. 1st; this makes the second *Vanessa* taken at light, my last list containing *V. atalanta*), *Smerinthus populi* (1), *Nola cucullatella*, *Gnophria rubricollis* (1), *Drepana lacetinaria* (1 male), *Pterostoma palpina* (1 male), *Notodonta chaonia* (1 male), *Asphalia flavicornis* (1 male), *Apamea didyma*, *Caradrina alsines* (4), *Agrotis agathina* (2), *Amphipyra tragopogonis*, *Panolis piniperda* (2), *Orthosia lota*, *Hypenodes albistrigalis* (numerous), *Eurymene dolobraria* (1 male), *Nyssia hispidaria* (9 males), *Boarmia abietaria* (5 males), *Zonosoma porata* (4), *Z. linearia* (several), *Acidalia dimidiata* (several males and females), *A. emarginata* (1), *Aspilates ochrearia* (male and female), *Cheimatobia boreata* (several males), *Eupithecia pulchellata* (1), *E. absinthiata* (1), *E. rectangulata*, *Cidaria associata* (1), *C. testata* (several), *Eubolia cervinata* (2 males), *Scoparia ambigualis*, *Scopula olivalis*, *S. prunalis*, *Botys ruralis*, *Ebulea sambucalis*, *Spilodes verticalis*, *Crambus inquinatellus*, *Nephopteryx spissicella*, *Pempelia palumbella* (1), *Rhodophæa marmorea* (1), *Peronea sponsana*, *P. comparana*, *Aspis udmanniana* (1), *Pædisca profundana*, *Semasia wœberiana*, *Depressaria umbellana* (1), *Bryotropha terella* (1). Besides these new species I took the following additional specimens of species already recorded, viz.:—*Nudaria mundana* (several), *Odonestis potatoria* (several males), *Stauropus fagi* (1 male), *Notodonta dictæoides* (1), *N. trimacula* (several males), *Tapinostola fulva* (2), *Charæas graminis* (1 male), *Luperina cespitis* (1 male), *Stilbia anomala* (4), *Noctua depuncta* (2 males), *N. c-nigrum* (1), *N. brunnea*, *Pachnobia rubricosa* (several), *Dasycampa rubiginea* (2), *Calymnia affinis* (1), *Dianthœcia capsincola* (1), *Asteroscopus sphinx* (2 females, males of course numerous), *Plusia chrysitis* (1), *Selenia lunaria* (3 males), *S. tetralunaria* (numerous males), *Himera pennaria* (1 female, males numerous), *Boarmia repandata*, var. *conversaria* (2 males and 1 female), *Geometra papilionaria* (5 males), *Acidalia imitaria* (3), *Lobophora carpinata* (numerous), *Anticlea nigrofasciaria* (several), *Tinea semifulvella*. The following, which were plentiful in 1893, were scarce in 1894, viz.:—*Pœcilocampa populi*, *Neuronia popularis*, *Luperina testacea*, *Noctua festiva*, *N. xanthographa*, *Cerastis vaccinii*, *Cidaria silaceata*. The following were exceptionally numerous in 1894, viz.:—*Pachnobia rubricosa*, *Anchocelis pistacina*, *A. lunosa*, *Selenia tetralunaria*, *Cleora lichenaria*, *Hybernia leucophæaria* (in spring), *H. aurantiaria* (in autumn), *Oporabia dilutata* (the last two species in hundreds), *Lobophora carpinata*, *Anticlea nigrofasciaria*. The traps were set in exactly the same places as in 1893.—E. F. Studd; Oxton, Exeter, Feb. 21st.

Nyssia hispidaria, &c.—When digging on March 7th I obtained a reddish pupa, under a very young elm, bordering a yard. Not knowing what it was, I put it, as usual, with my other pupæ, into the breeding-cage. The following morning, on looking to see if anything had emerged during the night, I found a moth quite new to me, and after looking it up found it to be *Nyssia hispidaria*, which is, I believe, a species new to the Gloucestershire list. Is it not rather peculiar to find the pupa of this species at the roots of elm? I also found a larva of *Cossus ligniperda* under oak in an earthen cocoon; the larva was about half-grown, and was not at all sleepy as if hybernating. Can any one explain this?—C. J. Nash; Standish Vicarage, Stonehouse, Glos.

Hybernia leucophæaria, &c., in January, 1895.—The present season has not, so far, given many opportunities for either insects or collectors to emerge. There were a few hours' mild weather on Jan. 20th, and an afternoon's search round oak-trunks reavealed the presence of many males of

Cheimatobia brumata that looked as if they had been out for some time; also of two males of *Hybernia leucophæaria*, one perfect, the other wofully crippled. A larva of *Cleora lichenaria* was sunning itself on a tuft of its food, which it could well do without making itself unduly conspicuous. Since then we have had a fair specimen of an arctic winter; and if insects have been on the move the collector has not. Jan. 20th is an early date for *H. leucophæaria*, but in mild seasons it is usually out by the end of the month. Larvæ of *C. lichenaria* seem to be on the move all the winter.—Charles Viggers; 36, Hardinge Road, Ashford, Kent, Feb. 18th, 1895.

I took a male *Hybernia leucophæaria* off Dene Park fence, near Shipbourne, on January 17th, although only five days previously there was skating.—D. P. Turner.

[The above notes are interesting, as they record the appearance of lepidopterous life during a few days' break in the great frost of 1895.—Ed.]

SOCIETIES.

Entomological Society of London.—*Feb. 20th*, 1895.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. W. M. Christy exhibited specimens of *Lycæna agestis*, caught in Sussex last summer, which had a white edging round the black discoidal spot. He said the specimens might, perhaps, be identical with the northern form of the species known as the variety *salmacis*. Mr. H. Goss exhibited a small collection of Lepidoptera from the South of France, made by Mr. Frank Bromilow. Amongst the species exhibited were the following:—*Heterogynis penella*, Hb., *Zygæna stæchadis*, Bkh., *Apamea testacea*, Hb., *A. dumerilii*, Dup., *Luperina matura*, Hufn., *Grammesia trigrammica*, Hufn., *Caradrina exigua*, Hb., *Calophasia platyptera*, Esp., *Eucrostis olympiaria*, H.-S., *Nemoria pulmentaria*, Gn., *Acidalia subsericeata*, Hw. (var. *mancuniata*, Knaggs), *A. filicata*, Hb., *A. rubiginata*, Hufn., *A. marginepunctata*, Göze, *A. imitaria*, Hb., *Boarmia consortaria*, F., *Ematurga atomaria*, L., *Aspilates ochrearia*, Rossi, *Cidaria fluviata*, Hb., *C. riguata*, Hb., *C. basochesiata*, Dup., *C. rivata*, Hb., *C. bilineata*, L., *C. vitalbata*, Hb., *Eupithecia oblongata*, Thnb., *E. pumilata*, Hb. (var. *tempestivata*, Z.), *Botys chermesinalis*, Gn. (var. *ostrinalis*, Hb.), *B. cespitalis*, Schiff., and *Adela australis*, H.-S. Professor Meldola invited discussion upon the address delivered by Mr. Elwes, as retiring President, on the Geographical Distribution of Butterflies, at the last Annual Meeting. He remarked that he had not himself had time to consider the paper in an adequate manner, but he thought that the discussion might lead to a useful expression of opinion if the speakers would deal with the question as to how far the scheme of distribution advocated by Mr. Elwes was borne out by a comparison with other orders of insects. He was of opinion that in considering schemes of geographical distribution, the results arrived at were likely to be of greater value the wider the basis on which they rested, and he therefore suggested that the question might also be taken into consideration as to how far it was justifiable to draw conclusions from the consideration of one division or one order only. He did not offer these observations in a spirit of adverse criticism, but simply with the object of setting the discussion going. Dr. Sharp remarked that geographical distribution consisted of two divisions—firstly, the facts; secondly, the generalisations and deductions that may be drawn from them. He thought that as regards insects generally our knowledge of the facts was not yet sufficient to warrant many generalisations. Still the impressions of those who have paid attention to particular groups of insects are even now of some importance, though at present based on incomplete knowledge. He thought the Rhopalocera would prove to be a somewhat exceptional group in their distribution. Notwithstanding that Australia and New Zealand are so poor in them, this was by no means the case with their Coleoptera, Australia being very rich, and its fauna of Coleoptera being very distinct. He thought that if Lepidoptera generally were well collected in Australia and New Zealand, it would be found that this order was not so poor in species as was supposed. He instanced the case of the Sandwich Islands, where it was supposed that there were very few species of Lepidoptera, and yet some five hundred species, or perhaps more, had been recently found there by Mr. R. C. L. Perkins, who had been sent to investigate the Natural History of the islands by a committee appointed by the Royal Society and the British Association. Mr. McLachlan said he was of opinion that no definite demarcation of regions existed, but that all the regions overlapped; in any case, the retention of Palæarctic and Nearctic as separate provinces was not warranted on entomological data. He thought that at the close of the glacial period some insects instead of going north were dispersed southwards, and that the present geographical distribution of some forms might thus be accounted for. The discussion was continued by Mr. Osbert Salvin, Mr. J. J. Walker, Herr Jacoby, Mr. Champion, Mr. Elwes, and Professor Meldola. The Rev. T. A. Marshall contributed a paper entitled "A Monograph of British Braconidæ, Part VI." Mr. J. W. Tutt read a paper entitled "An attempt to correlate the various Systems of Classification of the Lepidoptera proposed by various authors." In this paper he criticised the opinions recently expressed by Mr. G. F. Hampson and Dr. T. A. Chapman, in certain papers published by them. A discussion ensued.

March 6th.—Professor Raphael Meldola, F.R.S., President, in the chair. The following gentlemen were elected Fellows of the Society:—Mr. H. T. Dobson, of Ivy House, Acacia Grove, New Malden, Surrey; Mr. Herbert Massey, of Fairfield, Fog Lane, Didsbury, Manchester; Mr. Thomas M. McGregor, of 30, North Methven Street, Perth, N.B.; Mr. Sidney Crompton, of Salamanca, Santa Cruz, Teneriffe; Mr. Benjamin Hill Crabtree, of The Oaklands, Levenshulme, Manchester: and Mr. G. A. K. Marshall, of Salisbury, Mashonaland, S. Africa. Mr. B. G. Nevinson exhibited a long series of *Heliothis peltigera*. He stated that the specimens were bred from larvæ found on the Dorsetshire coast during July, 1894, feeding on the flowers of *Ononis arvensis*, which were extremely luxuriant: a few also were taken on *Hyoscyamus niger*. He added that all the larvæ went down by the end of July. The first emergence took place on August 20th, and they continued coming out at the rate of about five a day, through the rest of that month and September; only five emerged in October, and the last one appeared on November 11th. Mr. Nevinson said that not one larva was ichneumoned, and only three or four imagines were crippled. Mr.

G. T. Bethune-Baker, Mr. Eustace Bankes, Mr. B. A. Bower, the Rev. Seymour St. John, and Mr. H. Goss made remarks on the habits and distribution of the species in England. Mr. Bower exhibited a variable series of *Scoparia basistrigalis*, Knaggs, showing light, intermediate, and dark forms, taken at Bexley, Kent, from 12th of June to 7th of July, 1891–94. He said the species appeared to be poorly represented in collections, and when present was almost invariably misnamed. Mr. Eustace Bankes commented on the rarity of the species, and said the specimens exhibited formed the most interesting collection of it and its varieties which he had ever seen. Lord Walsingham exhibited larvæ of *Pronuba yuccasella*, which he received more than four years ago from Colorado, and which were still living. One specimen of the moth had emerged two years ago. Mr. Goss exhibited, for Mr. G. C. Bignell, a pupa of a Tortrix with the larval legs, and also a specimen of a sawfly, *Emphytus cinctus*, L., with eight legs. Mr. G. H. Verrall and Mr. McLachlan made some remarks on the latter species, and as to the insertion of the fourth pair of legs. Professor Meldola exhibited a wooden bowl from W. Africa, from which, after arrival in this country, a number of beetles (*Dermestes vulpinus*) had emerged. Specimens of the latter were also exhibited. It was not clear to the exhibitor whether the larvæ had fed upon the wood, or had simply excavated the cavities which were apparent in the interior of the bowl for the purpose of pupating. Mr. McLachlan, Mr. J. J. Walker, Herr Jacoby, and Lord Walsingham made some remarks on the habits of *Dermestes*, and it was generally considered that the larva of *D. vulpinus* excavated the wood for the purposes of pupation, and not for food. Mr. Kirkaldy called attention to and exhibited three volumes of an important new work, by Dr. McCook, on 'American Spiders.' Mr. Champion read a paper entitled "On the Heteromerous Coleoptera collected in Australia and Tasmania by Mr. J. J. Walker, R.N., during the voyage of H. M. S. 'Penguin,' with descriptions of new genera and species. Part II." Mr. Walker and Mr. Gahan made some observations on the distribution of some of the species described. Mr. Roland Trimen contributed a paper entitled "On some new Species of Butterflies from Tropical and extra-Tropical South Africa." Mr. G. A. James Rothney contributed a paper entitled "Notes on Indian Ants," and sent for exhibition a number of specimens in illustration of the paper, together with nests of certain species.—H. Goss, *Hon. Sec.*

South London Entomological and Natural History Society.—*February* 28*th*, 1895.—Mr. T. W. Hall, F.E.S., President, in the chair. Mr. Beauman, 18, Victoria Road, S.W., was elected a member. Mr. Edwards exhibited larvæ of the Dipteron *Eristalis tenax*, L., found in some water in the stump of an old apple-tree. Mr. Adkin exhibited a series of *Crambus ericellus*, Hb., from Sutherland. It was stated that this species differed from *C. pascuellus* in always having the silvery stripe narrow and even. Mr. Tutt exhibited continental specimens of *Xanthia ocellaris*, and pointed out the features distinguishing it from *X. gilvago*, viz.:—(1) the lower part of the reniform stigma was white; (2) the nervures were well dotted with white scales; (3) the apex of the wing was different. Mr. Tutt also read a paper entitled "*Lithosia lutarella*, L., and its varieties," illustrating it by a magnificent series from Deal and the Alps.

March 14*th*.—The President in the chair. Mr. E. C. Rye, of Fulham, was elected a member. Mr. Frohawk exhibited a magnificent bred series of *Vanessa c-album*, L., showing both light and dark forms of male and female from one batch of ova; a discussion ensued, in which it was suggested that the pale form was the one which produced a second brood, while the dark form went early into hybernation. Mr. Adkin, a series of *Melanippe hastata*, L., from Sutherland, intermediate in coloration between the usual southern and northern forms. Mr. Sauzé, a specimen of *Œdipoda tartarica*, taken among imported garden produce at Brixton. Mr. T. A. Hall, a Pierine butterfly, *Ithonia patilla*, with Danaine mimic *Dismorphia fortunata*, from Nicaragua. Mr. Edwards, four varieties of the female of *Papilio memnon*, *P. segonax*, *P. westwoodii*, two *P. epycides*, two *P. anticorates*, and *P. pammon* var. *javanana*.—Hy. J. Turner (*Hon. Report Sec.*).

Birmingham Entomological Society.—*February* 18*th*, 1895.—Mr. G. T. Bethune-Baker in the chair. A letter was read from Mr. G. H. Kenrick, requesting to be relieved of the office of President for the present year; Mr. G. T. Bethune-Baker was therefore elected President in his stead, and Mr. P. W. Abbott to the office of Vice-President thus left vacant. The following were exhibited:—By Mr. Bethune-Baker, a number of Lepidoptera, including English *Lælia cœnosa*, and *Acidalia contiguaria; Aporophylla lutulenta* var. *sedi*, from Ireland; *Noctua depuncta;* very dark *Acronycta ligustri*, from Llangollen; some beautiful brown forms of *Rumia cratægata;* and other nice varieties and rarities. By Mr. R. Freer, a number of varieties, chiefly from Cannock Chase; among others were a *Rumia cratægata* of a lovely pale or yellow orange colour, deeper along the costa, from the Chase; *Ennomos angularia*, several varieties from Hyde Park, one male of a uniform fuscous colour, with pale fuscous hind wings and yellow thorax and head; *Notodonta dictæa*, one from the Chase, of a delicate pale brown without white in any portion; a specimen of *Noctua festiva*, of the form called *conflua* by Newman, from the Chase; a brilliant orange specimen of *Xanthia aurago* from Ashford, Kent; and varieties of *Notodonta dictæoides*, *Asphalia flavicornis*, *Diloba cœruleocephala*, &c. By Mr. C. J. Wainwright, a box of Lepidoptera, including some nice *Acronycta leporina* var. *bradyporina*, one from Knowle being very dark and suffused. By Mr. E. C. Rossiter, a number of Lepidoptera, chiefly from Arley, including a specimen of *Lycæna alexis*, very chalky, and closely approaching *L. corydon* in colour, with a white spot in the centre of each wing; a fine dark *Cleora glabraria* from the New Forest; and other varieties, &c. By Mr. R. G. B. Chase, *Dianthœcia conspersa*, from Lundy Isle. By Mr. P. W. Abbott, bred series of *Hadena suasa* from Hull, *Sesia culiciformis* from Market Drayton. By Mr. R. C. Bradley, a rose-bush covered with empty cases of *Coleophora gryphipennella*, from his garden at Sutton; also *Orthosia suspecta* from Barnt Green.—Colbran J. Wainwright, *Hon. Sec.*

Lancashire and Cheshire Entomological Society.—*March* 11*th*, 1895.—Mr. S. J. Capper, F.E.S., F.L.S., President, in the chair. Mr. R. J. Thompson was elected a member of the Society. Mr. R. Newstead, F.E.S., Curator of the Grosvenor Museum, Chester, read some "Observations on Insects found in Birds' Stomachs." The lecturer gave a résumé of some 450 post-mortem examinations of birds which he had obtained from various parts of Cheshire during a number of years. Of the many records, the Coleoptera were by far the most numerous, this being due to the fact that their hard elytra are not assimilated so rapidly as are the softer Diptera or Lepidoptera. Many species of Geodephaga were found in the rook, jay, wagtail, and other birds. *Dytiscus punctulatus* and *Helophorus aquaticus* were the only species of the Hydrodephaga observed. Of the latter species about 150 specimens were found in a golden-eye duck (*Glangula glaucion*); the same insects also occurred in several other birds. The Brachelytra were only represented by two or three species, found only during hard weather. The Aphodii were frequently observed; *A. punctato-sulcatus* in many birds; also *A. fimetarius* in the starling. A nightjar (*Caprimulgus europæus*) had regaled itself with six specimens of *Geotrupes stercorarius*, five of which were found almost perfect. Although the hard coverings of the Curculionidæ (Rhyncophora) are said to save them from attack ('Darwinism,' p. 260), these insects far outnumbered the other Coleoptera; the names of several species were given, including *Sitones*, *Phyllobius*, *Apion*, &c. The finding of *Phyllotreta undulata* and *P. nemorum* is of economic importance; three records of these were given, all from the tree-creeper (*Certhia familiaris*). During severe weather two specimens of *Forficula* were found. From this fact it was suggested that these insects are nauseous. Of the Hymenoptera, the discovery of two specimens of the larvæ of a species of *Tenthredo* in the cuckoo was of the most importance. Several species of Ichneumonidæ, numerous specimens of a species of *Cynips*, and two species of *Formica* were also recorded. Larvæ and imagines of the Lepidoptera occurred frequently, but could rarely be identified. Larvæ of *Abraxas grossulariata* in the cuckoo were the most important finds in this order. Psyllidæ, Aphidæ, and Coccidæ were found in several species of the Paridæ; three species of Coccidæ were determined. The Diptera were largely represented, but, like the Lepidoptera, they too were most difficult to determine. The President exhibited a fine series of varieties of *Smerinthus tiliæ;* Mr. Watson, the rare *Papilio bairdii* and its pupa; Mr. H. B. Jones, Lepidoptera from the West Coast of Africa; and Mr. R. J. Thompson, exotic Coleoptera found in imported timber.—F. N. Pierce & A. B. Jones, *Hon. Secs.*

RECENT LITERATURE.

Report of Observations of Injurious Insects and Common Farm Pests during the year 1894, *with Methods of Prevention and Remedy.* By Eleanor A. Ormerod. Pp. viii, 122, and Appendix. London: Simpkin, Marshall & Co. 1895.

It would appear from this Report that the year 1894 was not marked by any widespread or very serious insect attack, although nearly all kinds of crop and orchard insect-pests were present during the season. To the lepidopterist it will seem curious to find the larvæ of such species as *Vanessa polychloros*, *Smerinthus ocellatus*, and *Gastropacha* (*Lasiocampa*) *quercifolia*, referred to as inimical to the fruit-grower's prospects. In another case, that of *Sesia tipuliformis*, some currant-bushes in Scotland were so badly infested that the growers determined to grub up and destroy every bush. At the conclusion of her remarks on the *S. ocellatus* attack Miss Ormerod says:—"It would often be the best way towards getting rid of them [the larvæ] to let some neighbouring collector of entomological specimens know of their presence." This is an excellent suggestion, and it is to be hoped that in future when any grower finds the foliage of his trees being devoured, or the stems and twigs tenanted, by unusual caterpillars, he will call in the assistance of a local collector of moths, as we are certain that such a course would be to the mutual advantage of both parties.

The Appendix to this Report is devoted to a lengthy consideration of *Hypoderma bovis*, the warble or ox bot fly. All the most important results of a long series of observations on this troublesome pest are brought together in connected form, and an account is given of the treatment found to be most efficacious in preventing attack or in curing the animals when affected. There is also a great deal of statistical information respecting the loss resulting from perforated hides and from "licked beef," a product of the warble attack.

The Cabbage-Root Maggot: with Notes on the Onion Maggot and Allied Insects. By M. V. Slingerland. Bulletin 78, Cornell University Agricultural Experiment Station, Entomological Division. Nov., 1894.

Deals more especially with that common garden insect the cabbage-destroying *Phorbia brassicæ*, Bouché, so well known, at least by its results, to growers of cauliflowers, cabbages, &c. Miss Ormerod ('Manual of Injurious Insects,' 1890) gives a concise life-history of this insect nuisance, and discusses remedial measures. In the report under consideration, a mass of information, largely original, is presented. Of the different methods, about seventy in number, recommended for preventing or fighting the attack, Mr. Slingerland considers that only some half-dozen are likely to be effective, and these he classes under two heads—A. Preventive, and B. Destructive. The preventive measures are:—(1) growing the plants in covered frames; (2) encircling the stems of plants in the open by tarred rings of paper or card,—these resting on the ground prevent the flies from depositing their eggs in a suitable position on the cabbage- or cauliflower-stem. The destructive methods are:—(1) rubbing the stems of the plants with the fingers so as to clear off the eggs,—this must be done every few days; (2) picking off the larvæ by hand,—this means taking up the plant, examining its roots, and then replanting it; (3) syringing the roots with, or otherwise applying, "insecticidal substances." All these methods of coping with the scourge in its various stages seem to be practical enough, and, if adopted, should put an end, at least for the time being, to the trouble. Two or three insect foes afford valuable assistance in the work of suppression, and this is an important fact which those who wage war against the pest will do well to remember. We are inclined to think that, often because the operator is unable to distinguish a friend from an enemy, useful and noxious insects are alike destroyed.

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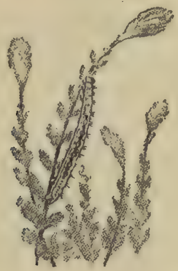
EMMELESIA TÆNIATA.

By J. B. Hodgkinson, F.E.S.



Larva of *Emmelesia tæniata.*

This very variable species, of which really good specimens are rarely to be obtained, generally occurs in damp woods, and when disturbed darts into dark places. It is very uncertain in its time of appearance. Once or twice I have captured some scores in a day. It seems especially numerous, or at least easy to take, after a thunder-storm, when it has been driven down among the laurel-trees for shelter.

First taken in 1825, by the late Mr. J. C. Dale, at Castle Eden Dene, Durham, it has since been met with at Dovedale in Derbyshire; at Flimby, near Maryport, Cumberland; and by the late Mr. Murton at Silverdale in Lancashire. I have myself taken it on the top of Whitbarrow, Witherslack, and on the Lancashire side of Windermere Lake; it is also recorded from Ireland.

The moth appears from the middle of June to the end of July. The larva hatches about six weeks after the egg is deposited, goes into hybernation when about a quarter of an inch long, and commences to feed again in April on the fruit of any of the mosses, but perhaps more frequently on a species of *Bryum* which grows in wet places. The following is a brief description of the larva:—

Length five-eighths of an inch. The upper portion of body is fairly hairy or spiny, light brown in colour, with a dorsal row of deeper brown diamond-shaped marks and a series of six black dots; lateral stripe pale yellow; head and under side of body pale ashy.

The diamond marks remind one of a "pug" larva, and the black dots are very distinct and striking. The entire series of metamorphoses, from the laying of the egg to the emergence of the perfect insect, occupy a period of about ten months.

[The figure at the head of this article has been drawn by Mr. Frohawk, from a rough sketch made by Mr. Hodgkinson some years ago.—Ed.]

ON THE CAUSES OF VARIATION AND ABERRATION IN THE IMAGO STAGE OF BUTTERFLIES, WITH SUGGESTIONS ON THE ESTABLISHMENT OF NEW SPECIES.

By Dr. M. Standfuss, Lecturer in both Academies at Zürich. Translated by F. A. Dixey, M.A., M.D., Fellow of Wadham College, Oxford.

(Concluded from p. 114.)

8. *Vanessa cardui*, L. (Larvæ all from Zürich.)

a. Warmth.

(1) Immediately after pupation, 6 hours at 40° C. (104° F.), then 12 hours at the normal temperature (about 22° C., 72° F.), then once more 6 hours at 40° C. (104° F.), afterwards at the normal (about 22° C., 72° F.), until emergence in 10—12 days after pupation.

Out of 42 pupæ, 28 butterflies came out good specimens. Of these, 26 had the normal colouring, and 2 belonged to ab. *elymi*, Rbr.; of the remainder, 12 were crippled, 10 being normal and 2 ab. *elymi*, Rbr., and 2 pupæ perished.

(2) Sixty hours at 36°—37° C. (97°—98° F.), then the normal temperature up to the time of emergence, 6 or 7 days after pupation.

An extraordinarily pale form, like those presented to the entomological museum of the [Zürich] Polytechnicum from very different parts of the tropics,—for instance, from the German colonies in East and West Africa.

Upper surface.—The red colouring, which in the greater number of specimens takes on a brownish tinge, becomes increased in extent on both fore and hind wing.

The three black spots forming a diagonal band across the fore wing become considerably reduced, and in many individuals the whole of the dorsal margin is coloured red, besides which the base of the wing, which is usually conspicuously darker, is rendered much lighter by the prevalence of red scales.

In the same way the hind wing becomes predominantly reddish brown. The four or five spots which correspond to the ocelli on the under surface never show, in this form, blue scales in their centres.

Under side.—Here also, as on the upper surface, all the blackish-brown colouring is diminished in consequence of an increase in the tints of red and reddish brown.

The pattern of the apex of the fore wing and of the whole of the hind wing, which both follow the same scheme, also becomes considerably lighter, but there is no noteworthy difference in the individual features of the pattern.

b. Cold. (Larvæ again all from Zürich.)

(1) Twenty-three days refrigerator, then 12 days longer at the normal temperature.

This gave rise to a very recognisable darkening of the whole insect, on both surfaces of each pair of wings.

Most of the specimens resemble a form received by me from Lapland, from the natural history dealer Kricheldorff, of Berlin, now dead.

A number of specimens go further than this form along the same line of development.

Upper surface.—The blackish-brown constituents of the pattern in the fore wing encroach far upon the red area, this latter in many specimens acquiring a tinge of light carmine. Moreover, those parts of the wing that remain red become shaded over with a rich besprinkling of blackish-brown scales, only one red spot before the end of the central cell being unaffected by this overclouding.

The large white costal spot is also in some specimens darkened by a powdering of blackish-grey scales.

The hind wings correspond in character to the fore wings. A small spot before the end of the central cell is the only one in the basal region that invariably remains red; the portion of the wing, however, between the row of [submarginal] spots and the outer margin does the same.

There is in these forms a frequent centring of the spots with greyish-blue scales, especially towards the anal angle.

Under side.—In most specimens the elements of the pattern are changed very slightly, or scarcely at all; the whole of the yellowish and light brown colouring, however, becomes much darker, whilst those parts that are almost white remain unchanged throughout, thus giving rise to a very abrupt and vivid contrast.

(2) Twenty-eight days refrigerator, the perfect insects emerging at the normal temperature 10 days afterwards. The butterflies, 33 per cent. of which were crippled, showed on the whole no difference worth speaking of from the series just described. The only noticeable point is that a small number were still darker than the most extreme specimens of the previous series.

9. *Argynnis aglaia*, L.

a. Warmth.

Four days at 36° C. (97° F.), then 1—2 more days at the normal temperature until the butterflies appeared.

These show—in the female as well—a very light reddish-brown ground colour on the upper surface, but no noteworthy modification of the black markings.

Again, on the under side the elements of the pattern are not altered in outline; nevertheless the greyish-green shades which occur at the base of the wing and just internally to the silver spots of the outer border are darker in tone, and stand out much more conspicuously than in average specimens.

b. Cold.

(1) Twenty-eight days in the refrigerator, then 12 days at the normal temperature until the butterflies appeared. Twenty-one pupæ yielded only three perfect insects; the remaining pupæ either perished or gave rise to crippled specimens.

The reddish-brown ground colour is unaltered. The black spots at the base of the fore wing increase in size; not so, however, the series of spots lying further out, nor the markings of the outer margin, nor again the pattern of the hind wing. On the under side of the hind wing the greyish-green shades, which I have already described in their place, take on a tinge of brown.

(2) Forty-two days in the refrigerator, then 16 days at the normal temperature.

Of 12 pupæ, 10 yielded no butterfly. The two that emerged are both aberrant, and both in the same direction.

Upper surface.—The reddish-brown ground colour becomes duskier, and the basal spots are enlarged. The root of the wing below the central cell is blackened. The series of spots which lie further out begin on both pairs of wings to dwindle. The spots lying in a curved series adjacent to the outer border of both fore and hind wing are prolonged in a conical form inwards.

Under surface.—The constituents of the pattern on the fore wing become larger or smaller in correspondence with those on the upper surface.

On the hind wing the greyish green between the three silver spots on the costal margin is darkened to a blackish brown; in other places also this darkening occurs at the edge of the silver spots; otherwise these show no substantial deviation from normal specimens.

10. *Dasychira abietis*, Schiff.

a. Warmth.

Sixty hours at 37° C. (98°—99° F.) killed 18 pupæ of this species so quickly that not one of them showed anything even approaching a perfect insect.

b. Cold.

Forty-two days refrigerator, then 12—15 days at the normal temperature, 6 male and 6 female pupæ gave 1 male and 4 females, all perfectly developed. In the remaining 7 pupæ the imago was fully formed, but did not emerge.

The blackish-brown scales besprinkled over the light ground colour are increased in amount. Moreover, the few scattered shades towards the anal angle of the hind wing are darker and more sharply defined.

From the facts now adduced it should be sufficiently clear that the influence of temperature in the pupal stage operates upon the aspect of the resulting perfect insect in an eminently definite manner. This, it is true, is clearly recognisable only in respect of the colouring and marking of the wings, but it is at times certainly visible in the shape as well.

In the first place we witness in part, by the experiments here communicated, the production of "seasonal forms" (as in the case of *V. c-album*, and to some extent in that of *P. machaon*); forms, that is, with a similar aspect to those that occur among the palæarctic fauna at certain definite seasons of the year.*

Secondly, there arise in part local forms and races; forms, that is, that occur constantly in certain definite localities, as in the case of *V. urticæ*, *V. cardui*, and to some extent *P. machaon* and *V. antiopa*.

In both of these results we have to deal with forms which, under the received nomenclature of the present day, come within the definition of "varieties," inasmuch as they constitute deviations from the types of the species which have become constant, and which keep to definite times of year (seasonal forms) or localities (local races).

Thirdly, there seem to arise forms of an entirely similar aspect to some which also occur exceptionally here and there at the present stage of the earth's history—that is to say, "aberrations."

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* It should here be mentioned that autumnal pupæ ought also to be submitted to these experiments, as was done by Weismann in the methodical conduct of his investigations. The experiments discussed above were only undertaken with summer pupæ.

Examples of this, from the experiments above recounted, are furnished by certain forms of *V. io*, *V. cardui*, and *Argynnis aglaia*.

It is accordingly in a high degree probable that a large number of the aberrations that occur in nature, of which the immediate causes have hitherto seemed so strangely obscure and incomprehensible, may have arisen by the influence of abnormal temperature-conditions on the pupal stage.

Nevertheless I should certainly not like to lay this down even as a probable law controlling all aberrations. There are undoubtedly a large number of aberrations which are not in any way connected with the conditions of temperature which have befallen the pupa. There is no reason at all why the special aspect of the perfect insect should be exclusively the result of antecedents belonging to the pupal condition.

Fourthly, these experiments give rise to *phylogenetic* forms; forms, that is, which are nowhere to be found on the earth at the present day within the compass of the species, but which may either have existed in past epochs, or may perhaps be destined to arise in future.

The first, which may be called "obsolete forms," show an approximation of these to other species which are their nearest relatives, and from whose ancestors they have been separated during past ages.

According to the above researches this separation resulted probably from the operation of a constant increase or decrease of temperature on the species in question during long periods of time. Such an influence may have been brought to bear through the modification of temperature-conditions having taken place in the actual habitat of the species, or from the species having migrated into a more southerly or northerly region. From the material discussed above, I may adduce as examples certain cooled forms of *V. io* and *V. antiopa*, and certain warmed forms of *V. atalanta*.

The second, *i. e.*, possible forms of the future, are further removed from the type of the related species, thus contrasting with the first kind of "phylogenetic forms" (certain warmed forms of *V. antiopa* and certain cooled forms of *V. atalanta*).

It is assuredly most remarkable that, as our experiments show, the very same conditions will lead to the transformation of one species into its varieties, and of another species, to some extent, into forms that manifest a most striking approach to those of other types.

It is therefore impossible to adopt any fundamental distinction between species and variety on the one hand, or between species and species on the other.

Should the question be asked, How does it happen that in the foregoing experiments one species becomes transformed entirely within the limits of its variation as observable at the present day, while another species far transcends those limits, the answer may be given as follows: that those species which have already existed on the earth for very long periods of time either under their present aspect or under one very closely resembling it—in short, the phylogenetically older species—come under the first category; on the other hand, those species that have only possessed their present aspect for a considerably shorter time—that is, the phylogenetically younger species—belong to the second category.

To demonstrate the high probability of this supposition would lead us too far from our present subject.

I must not omit to mention that the modifications induced by these experiments cannot all be classed under the four headings so far given; there is, in fact, a small unexplained residue, constituting a fifth group, which possibly represents the completely independent reaction of the individual species, uncontrolled by any inherited developmental tendency, to the influences brought to bear upon it. We must not forget that agents were employed that in nature never, or only most exceptionally, operate upon these creatures with such intensity. Still, as the short span of human life does not allow any one man to expose methodically for successive centuries (which alone would give any prospect of results) generation after generation of such creatures as are suitable for experiments of this kind to conditions which may be expected to have an effective influence, and which are actually to be met with here and there upon the earth, the only course that remains open for the experimenter is to intensify the conditions which determine the changes of the organic world, and to take the sum of the series instead of the terms of the series at length.

As above stated, I had already in 1892 (Entom. Zeitschr., Guben, Dec. 1st, 1892) clearly hinted at the phylogenetic character of one of these forms, and had then signified my intention of publishing further details at the earliest opportunity.

This explanation of the forms now in question has perhaps been offered for the first time in all entomological literature by myself.

In order to avoid reasoning from inadequate data, and other forms of error, which are only too apt to be induced by accidental peculiarities of the material subjected to experiment, or by performing the experiments on an insufficient number of species, I have during the last few years tested the influence of temperature on over 5000 pupæ—3000 or so in the present year alone.

It was proved in the course of this work that experiments with raised temperatures were very difficult, since the great number of species hitherto tested showed themselves to possess small powers of resistance to high degrees of warmth (40° C., 104° F., rapidly caused death in almost all species, *P. machaon* and *V.*

c-album proving the least sensitive), so that an enormous amount of material had to be sacrificed before any laws could be deduced from experiments in this direction.

On the other hand, low temperatures for even four weeks were much better tolerated. These circumstances point to the conclusion that the species tested were constrained in past ages to accommodate themselves much more to lower than to higher temperatures.

In the face of these difficulties it would have been even now impossible for me to undertake the management of such a vast mass of material without the faithful and intelligent help of my wife.

It is clear that these experiments are capable of being varied indefinitely, and of being performed in other ways than those here described on the species discussed, or on other species besides these, especially those Heterocera that emerge after a short pupal period, thus opening up an excellent field of work for entomological study. It is also in the highest degree probable, according to the results now communicated of the influence of temperature on the pupa, that in the temperature-experiments recorded under the previous heads of "Egg" and "Larva" the influence upon the aspect of the resulting imago could be either intensified, checked, or perhaps even reversed according to the degree of temperature to which the pupa was finally exposed in such experiments.

In the Trans. Ent. Soc. Lond., 1893, pp. 55–67, with pl. iv., and again pp. 69—73, this subject is more fully treated.

Mr. Frederic Merrifield there publishes his very careful experiments made with different temperatures on the pupæ of *Pieris napi*, L., *Polyommatus* (*Chrysophanus*) *phlœas*, L., *Vanessa atalanta*, L., and *Zonosoma* (*Ephyra*) *punctaria*, L.

Mr. Merrifield has also repeatedly published very laborious researches in the same subject in previous volumes of the 'Transactions,' and in the last volume (that for 1894) has added more. He varied these experiments in very different ways, and I much regret that extreme pressure of work precludes me from giving here a more detailed account of them.

The following, however, must be mentioned:—With respect to *V. atalanta*, Mr. Merrifield made observations closely similar to mine; but it is especially worthy of note that pupæ of *P. phlœas* and *Z. punctaria*, of which the former had lain for ten weeks and the latter for three months in the refrigerator, being immediately afterwards exposed to the influence of a temperature of 87°—90° F., gave rise to perfect insects almost exactly resembling those produced by pupæ of each species that had been immediately exposed to these high temperatures without any sojourn in the refrigerator.

In connection with the results of Mr. Merrifield's experiments on *V. atalanta*, Dr. F. A. Dixey discusses the question of phylogeny. He finds phylogenetic relations between the heat-modification of *V. atalanta* and *V. callirrhoë*, F., &c.; also between the cold-modification of *V. atalanta* and *Grapta c-aureum*, L., *Pyrameis gonerilla*, F., &c.

And now, in conclusion, a few words as to the influence of moisture on the pupa.

In my 'Manual,' pp. 124, 125, the fact is recorded that out of a large series of pupæ of *Endromis versicolor*, L., *Saturnia pavonia*, L., and *Aglaia tau*, L., I had a few emergences without previous hybernation of the pupa. The aspect of the individuals belonging to the first two species was markedly altered.

The numerous temperature-experiments of the last few years just recorded, which resulted in so remarkably evident a reaction of the species selected for experiment, lead unquestionably to the conclusion that a case of this kind is not purely a matter of innate or primary tendency on the part of individuals whose constitution is biologically abnormal, but rather that some external factor must here have been brought into play.

Since then I have made the following observations. Large numbers of pupæ of *Saturnia* (in these cases from 200 to 400 specimens were used) were kept very dry for 7—10 weeks from June to the end of September. They were then freely and repeatedly moistened, and about 1 per cent. of the moths emerged from these pupæ 10—20 days after the damping.

The fully-developed moths mostly show a departure from the ordinary form of the species, which may be characterised as follows: the elements of the pattern are not sharply outlined, but more or less washed-out and confused.

As I have frequently repeated this experiment with the same result, it cannot possibly be a matter of mere chance; and the facts already mentioned in my 'Manual,' and given at length above, may be referred to similar causes which were disregarded at the time.

Further, on a comparison of these observations it seems probable that similar conditions in nature may have similar results, *i. e.*, that the exceptional appearance at midsummer or in autumn of species which as a rule do not occur at such times in the perfect state, but hybernate as pupæ, may have similar causes; that is to say, a copious rainfall after a long period of drought.

Supposing then the numbers of such abnormal individuals of a species (whose descendants must, it is true, accommodate themselves to widely different conditions of life) to be sufficient for the permanent establishment of the abnormality, then these individuals will form the starting-point for a new series of developments, which in course of time, in consequence of the impossibility of a renewed intercourse with the still unmodified individuals of the species, will constitute first a permanent variety and eventually a well-defined species.

Saturnia boisduvalii, Ev., from East Siberia and North Japan (Graeser, Berl. Entom. Zeitschr. 1888, p. 135), also *Bombyx catax*, L., and *B. rimicola*, Hb., both from Central Europe, all of which species appear as moths in the autumn and pass the winter in the egg-state, may very probably have separated by the operation of similar causes in past ages from the closely-allied Saturniidæ and Bombycidæ, which still hybernate as pupæ.

In this connection it may be mentioned that among the Palæarctic fauna there is a widely-prevailing law that species with a long pupal stage yield the perfect insect in spring or late autumn,—after a period, that is to say, of copious rainfall; whereas the summer fauna is almost entirely composed of species which undergo a rapid development from pupa to imago.

May the present communication be the means of setting on foot many researches, which will not only serve the object of filling the cabinets of entomologists with valuable specimens, but will also bring welcome contributions to the study of scientific Zoology.

[Zürich, end of August, 1894.]

RHOPALOCERA IN THE GUILDFORD DISTRICT.

By W. Grover.

As I have paid some attention to the above for several years, perhaps the following remarks thereon may not be entirely without interest, more especially as I have not seen any notes on the Rhopalocera of this district in the 'Entomologist' for some years, except a very short one (Entom. xxv. 309). The present observations refer to this immediate neighbourhood only, all the species mentioned having been taken—with one exception—in the fields and woods to the east and within four miles of the town. Although long walks in other directions have failed to produce any additional species, I cannot claim to give anything like a complete list, as I feel certain that many others are to be found, even within a four-mile radius, if worked thoroughly in every direction by any one with more time at his disposal than falls to my share.

I regret I have been unable to make use of the excellent "suggestions for recording," made in the 'Entomologist' two years ago; but, for the reason above mentioned, my chances of observation are too uncertain to be of any value for the purpose then suggested.

Of the preliminary stages I have had scarcely any experience, having bred only the very common species, such as *Pieris brassicæ*, *P. rapæ*, *Vanessa urticæ*, *V. io*, &c.

The chief geological formations in this district (from north to south, the newest to the oldest) are:—I. Lower Bagshot Sand. II. London Clay, with patches of drift gravel. III. Chalk (on which the town itself stands); the highest part of the chalk range is, in some places, capped with sand and gravel, which are in most cases covered with woodland, thus presenting a great contrast to the tracts of bare down which surround them. IV. Lower Greensand (Folkestone and Hythe beds). There is a large inlier of Atherfield and Wealden Clay in this formation; it forms a tract of low ground —much of it marshy and uncultivated—about five miles long and two wide, but it is to a great extent covered by river-gravel, &c., accumulated by the Wey, which runs in a north-easterly direction through it, and also through the whole district.

Pieris brassicæ. Very common. Some years abundant; but not so common as usual in 1893, and very rare in 1894.—*P. rapæ.* Very common every year. First seen in 1894, March 27th.—*P. napi.* Very common; but not so abundant as *rapæ*.

Euchloë cardamines. Very common in most years, but rather scarce and late in 1894; not seen before May 3rd.

Colias edusa. Fairly common in August and September, 1892, in clover fields east of the town. Not seen before or since.

Gonopteryx rhamni. Not very common. I have never seen more than twenty or thirty specimens in one season, and some years only a few. Rare in 1894.

Argynnis euphrosyne. Common, but local in woods. Out very early in 1893; first seen April 19th. Rather late and not common in 1894; first specimen seen May 4th.—*A. aglaia.* One female specimen captured August 6th, 1893.

Vanessa polychloros. Rare. One specimen, August 3rd, 1885; another, June 11th, 1886; and a third, March 10th, 1893; also two in 1894, on March 30th and April 2nd.—*V. urticæ.* Abundant every year. I bred some hundreds of this species in 1893. A few varied slightly in ground colour and in the size of the black markings, but I did not obtain anything remarkable.—*V. io.* Fairly common in most years; but only a very few seen in 1893, and none in 1894. I have bred a large number of this species at various times, but beyond a slight variation in size they were all strictly typical.—*V. atalanta.* Rather commoner than the last species. The variety with the red band on the fore wings, nearly divided a little below the middle, is as common as the type in this district. A specimen was taken at treacle about 9 p.m., August 23rd, 1886.—*V. cardui.* Not common, and not regular in appearance. A few specimens seen most years in August and September; sometimes commoner in May or June after hybernation. None seen in 1893, and only one in 1894.

Pararge egeria. Not common, and local in woods. There are at least two broods in the year, and I think sometimes three, if not four, but am unable to decide with certainty. Difficult to obtain in good condition; even freshly-emerged specimens are nearly always more or less chipped. — *P. megæra.* Common every year. On October 22nd, 1893, I saw about a dozen specimens of this species; they were all quite fresh and in good condition, possibly some of a partial third brood? Not so common as usual in 1894. During the last few years this species seems to have become far less common than it was ten or twelve years ago.

Satyrus semele. Rare. Five specimens taken and about twenty others seen, August 3rd, 1885; but not seen or heard of since, although it has been searched for every year in the same locality.

Epinephele ianira. Abundant every year in all parts of the district. — *E. tithonus.* Common, but never so abundant as the last species. Some years rather scarce. — *E. hyperanthus.* Common, but never so abundant as the two last species, and also very local. The ocellated spots on both the upper and under sides vary in size and number, but I have not seen or taken any very exceptional specimens.

Cænonympha pamphilus. Abundant, but local. This is the most abundant species of all; hundreds may be taken on almost any day from May to October in most years. But from its small size, and also its habit of taking only short flights near the ground, it does not force itself upon our notice as do the larger and more conspicuous species.

Thecla rubi. Rather scarce. A few specimens seen flying round the tops of tall bushes of whitethorn and elder in a wood on April 19th and 22nd, 1893. Not seen in 1894.

Polyommatus phlæas. Fairly common in some years. This is a very irregular species; it was common in September, 1893, and a few also seen in May of that year; but only a single specimen seen in 1894.

Lycæna ægon. This species is the one exception mentioned. A few specimens taken July 30th, 1891. They were flying among heather on the common near Woking railway station, which is about six miles north of Guildford. — *L. astrarche.* Not very common; but it is easily overlooked among the swarms of *L. icarus.* Only noticed in one or two places on the chalk downs, where its food-plant (*Helianthemum chamæcistus*) is common. — *L. icarus.* Abundant every year; particularly so in July and August, 1892. As I have not paid special attention to this species, I cannot say anything in reference to the variation it may exhibit in this district. — *L. corydon.* Fairly common every year on the chalk downs. Although I have seen or taken the male every season since 1886, I have never met with a female specimen. — *L. argiolus.* Not common. It occurs in several places among holly, but only in very limited numbers. Met with for the first time on April 21st, 1892; out much earlier in 1893, but I did not make a note of the exact date; in 1894, first specimen seen April 8th. I have never seen any specimens of a second brood. — *L. minima.* Rare. This little species I have only met with on one occasion (in 1885). A very few specimens were seen in an old chalk pit near the town; the locality has been searched several times since, but without any others being discovered. Most likely it is to be found in other very limited areas in the district.

Syrichthus malvæ. Common, but local in woods. Has any one previously noticed the great resemblance between this species and

Euclidia mi? I was particularly struck with it on May 24th, 1894, when both species were on the wing together. I saw and captured what I at first took to be a rather large specimen of *malvæ*, but a nearer examination proved it to be *mi* (a female). The males being smaller, their resemblance to *malvæ* is even greater. I may add that the specimens of *mi* were all rather worn; it is quite possible that if freshly emerged the yellower markings would be enough to distinguish it when on the wing from *malvæ*.

Nisoniades tages. Rather local, but commoner than the last species. It is found at the same time and in the same localities as *malvæ*. A single specimen of a second brood, which I captured on August 6th, 1893, is rather darker, and has the markings rather less distinct than usual.

Hesperia thaumas. Fairly common in some years, but it is very local in this district. Common in 1892; rare in 1893; and not seen in 1894.—*H. sylvanus.* Common; in some years it is abundant everywhere. Rare in 1894. I have several times found the larvæ of this species, but only succeeded in rearing the imago on one occasion, June 19th, 1886.—*H. comma.* Rather rare, and very local in this district. I captured a few specimens in August, 1885, but saw no others until August, 1891, when I saw a number in the possession of an entomologist, who was at that time living near Guildford. He informed me that they were taken at the same spot as I captured it six years before. In August, 1892, the locality was visited, but only one specimen was seen; I think the species was not out so early as usual on that occasion. I regret that I have been unable to visit the locality at the right season since.

The foregoing list of thirty-three species contains only those noticed by myself during the past ten years. Although I have heard of one or two others being taken, such as *Colias hyale* and *Melanargia galatea*, I have not included them in the list.

Guildford, February, 1895.

AFRICAN RHOPALOCERA.

By Philip de la Garde, R.N., F.E.S.

The following is a list of Rhopalocera collected by me on the Cape of Good Hope Station during the last two years.

For the identification of the majority of the species I am indebted to Mr. Trimen, Curator of the South African Museum at Cape Town.

Danais (Latr.) *chrysippus*, Linn.; St. Helena. *D. dorippus*, Klug; Mombasa. *D. alcippus*, Cram.; Sierra Leone; Bathurst. *D. limniace*, Cram.; Mombasa.

Amauris (Hübn.) *dominicanus*, Trim.; Mombasa.

Ypthima (Westw.) *asterope*, Klug; Mombasa; Zanzibar.

Pseudonympha (Walleng.) *hyperbius*, Linn., *P. vigilans*, Trim., *P. sabacus*, Trim., *P. trimenii*, Butl., and *P. cassius*, Butl.; Simon's Town.

Leptoneura (Walleng.) *clytus*, Linn., and *L. cassus*, Linn.; Simon's Town. *L. cassina*, Butl.; Saldanha Bay.

Mycalesis (Doubl.) *safitza*, Hewits.; Mombasa; Zanzibar. *M. perspicua*, Trim.; Zanzibar.

Melanitis (Fab.) *leda*, Linn.; Mombasa.

Acræa (Fab.) *horta*, Linn.; Simon's Town. *A. neobule*, Doubl.; Mombasa. *A. natalica*, Boisd.; Zanzibar. *A. cecilia*, Fab.; Bathurst; Sierra Leone. *A. encedon*, Linn.; Zanzibar. *A. buxtoni*, Butl.; Mombasa; Zanzibar. *A. serena*, Fab.; Bathurst. *A. bonasia*, Fab.; Sierra Leone. Three species from Sierra Leone, and two from Zanzibar, at present undetermined.

Atella (Doubl.) *phalantha*, Drury; Mombasa.

Pyrameis (Doubl.) *cardui*, Linn.; Simon's Town; St. Helena; Ascension; Tristan da Cunha (?).

Junonia (Doubl.) *cebrene*, Trim.; Mombasa; Bathurst. *J. clelia*, Cram.; Mombasa; Zanzibar; Bathurst; Sierra Leone.

Precis (Doubl.) *natalica*, Felder; Mombasa.

Eurytela (Boisd.) *dryope*, Cram.; Sierra Leone. One species from Zanzibar, unidentified.

Hypanis (Boisd.) *ilythia*, Drury; Mombasa; Zanzibar.

Neptis (Fab.) *agatha*, Cram.; Sierra Leone.

Diadema (Boisd.) *misippus*, Linn.; Mombasa; Ascension.

Aterica (?). One species from Zanzibar.

Humanumida (Hübn.) *dædalus*, Fab.; Bathurst.

Lycæna (Fab.) *osiris*, Hopff.; Zanzibar. *L. barkeri*, Trim.; Mombasa. *L. asopus*, Hopff.; Zanzibar. *L. asteris*, Godt., *L. ortygia*, Trim., *L. methymna*, Trim., and *L. messapus*, Godt.; Simon's Town. *L. lysimon*, Hübn., and *L. lucida*, Trim.; Zanzibar. *L. bœtica*, Linn.; Zanzibar; Cape Peninsula; St. Helena; Ascension; Bathurst. *L. sichela*, Walleng.; Zanzibar; Bathurst. *L. lingeus*, Cram., and *L. palemon*, Cram.; Simon's Town. *L. telicanus*, Lang; Zanzibar; Mombasa. *L. moriqua*, Walleng.; Mombasa. *L. thespis*, Linn.; Simon's Town. Three species from Bathurst, unidentified.

Lachnocnema (Trim.) *bibulus*, Fab.; Zanzibar.

Lycænesthes (Moore) *sylvanus*, Drury; Mombasa.

Deudorix (Hewits.) *antalus*, Hopff.; Sierra Leone; Bathurst. *D. licinia* (female ?), Mabille; Mombasa. One species from Sierra Leone.

Hypolycæna (Felder) *philippus*, Fab.; Mombasa. *H. lara*, Linn.; Simon's Town.

Iolaus (Westw.) *bowkeri*, Trim.; Mombasa.

Zeritis (Boisd.) *zeuxo*, Linn.; Saldanha Bay. *Z. chrysaor*, Trim., *Z. pyroeis*, Trim., and *Z. thysbe*, Linn.; Simon's Town. *Z. osbecki*, Auriv.; Saldanha Bay. *Z. thyra*, Linn., and *Z. pierus*, Cram.; Simon's Town.

Arrugia (Walleng.) *protumnus*, Linn.; Simon's Town.

One specimen from Bathurst unidentified, but apparently allied to *Eurytela*.

Terias (Swains.) *brigitta*, Cram.; Bathurst. *T. zoe*, Hopff.; Mombasa; Zanzibar; Bathurst. *T. floricola*, Boisd.; Sierra Leone. One species from Sierra Leone, unidentified.

Mylothris (Butl.) *agathina*, Cram.; Zanzibar; Durban. One species (*? chloris*) from Bathurst, unidentified.

Pieris (Schrank.) *mesentina*, Cram.; Bathurst; Mombasa. *P. severina*, Cram., and *P. boguensis*, Feld.; Mombasa. *P. creona*, Cram.; Bathurst. *P. hellica*, Linn.; Saldanha Bay; Port Elizabeth. *P. glauconome*, Klug; Bathurst.

Herpænia (Butl.) *eriphia*, Godt., var. *lacteipennis*, Butl.; Bathurst.

Teracolus (Swains.) *ione*, Godt., *T. annæ*, Walleng., *T. auxo*, Lucas, and *auxo* var. (?); Mombasa. *T. evippe*, Linn.; Sierra Leone. *T. omphale*, Godt., and *T. vesta*, Reiche; Mombasa. One species from Mombasa, and one from Zanzibar, unidentified.

Colias (Fab.) *electra*, Linn.; Cape Peninsula.

Eronia (Boisd.) *cleodora*, Hübn.; Mombasa.

Callidryas (Boisd.) *florella*, Fab.; Mombasa.

Papilio (Linn.) *demoleus*, Linn.; Simon's Town.

Cyclopides (Westw.) *malgacha*, Boisd.; Simon's Town. *C. mineni*, Trim.; Mombasa.

Pyrgus (Westw.) *vindex*, Cram.; Simon's Town. *P. diomus*, Hopff.; Zanzibar. One species from Mombasa, unidentified.

Pamphila (Fab.) *hottentota*, Latr.; Simon's Town. *P. lugens*, Hopff., and *P. fatuellus*, Hopff.; Mombasa. One species from Simon's Town, and one from Zanzibar, unidentified.

Hesperia (Fab.) *forestan*, Cram., and *H. anchises*, Gerst.; Mombasa.

If any one should wish for any information as regards locality or date of capture of any species named, I shall be very pleased to give such in as great detail as I may be able.

H.M.S. 'Raleigh,' Simon's Town, Oct. 29th, 1894.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 82.)

Phothedes captiuncula, *Tr.*, var. *tincta*.—Neither the type nor its darker variety *expolita* seems to occur in Ireland. Mr. Birchall found a richly-coloured form in Co. Galway, which he did not describe, but which is so distinct that it is worthy of a varietal name. It approaches *Miana literosa* in colour, though in size and design easily distinguishable. Fore wings: basal third of a warm grey, somewhat mottled, followed by a deep rose-coloured band reaching from costa to inner margin, bordered interiorly by a very sinuous festooned line of purple-brown, edged externally with grey, and exteriorly by one of similar colours, deeply elbowed toward the outer margin of the wing; the outer third of the wing is of a shining pink, with a darker ruddy patch along the costa, but not reaching to the apex, and a clear whitish suffusion along the lower and outer portion of the red central band, corresponding to the whitish patch shown in the same position in *Miana strigilis* and *fasciuncula*. Hind wings of a sooty brown, shot with a ruddy reflection. All fringes of a dirty grey. Thorax of a dingy brown; abdomen paler. Extremely local, but there plentiful. In a field near Galway, and in a portion of Castle Taylor demesne near the village of Ardrahan, numerous. No doubt it will be found elsewhere in Galway and perhaps Clare, whose bare limestone tracts thinly covered with herbage correspond with its favourite haunts in the neighbouring county.

CELÆNA HAWORTHII, *Curt.*—This moth occurs in most Irish counties, as might be expected from the large tracts of bog and moorland in Ireland abounding with various species of bog-cotton grass, in the roots of which the larva feeds; but, nevertheless, Mr. Campbell informs me, falls a victim to some species of ichneumon. Nevertheless, though locally very abundant, it is not so frequently met with as might be expected, as, except when flying by day, it is inconspicuous, and difficult to take at dusk. It is, however, attracted by the flower of ragweed, but is then usually worn. Various forms are met with, the handsomest of which is very clearly marked on a reddish brown ground. This occurs at Killarney; Crossmolina, Mayo; Markree, Co. Sligo; shores of L. Swilly, Co. Donegal; and Ballycastle, Co. Antrim (*Tutt*). Examples with both stigmata and the white nervures conspicuous are frequent; but I think a large proportion of Irish specimens show a tendency towards obsolescence of design, notably in regard to the transverse strigæ. Localities:—"Common on the Dublin and Wicklow Mt." (*B.*); above Powerscourt Waterfall and L. Bray; Killynon and elsewhere in Co. Westmeath; Mohill, Co. Leitrim; Toberdaly and about Shannon Harbour, King's Co.; Markree, Rockwood, Croagh Mt. near Dromore West, very abundant, and Lissadell, Co. Sligo; Inishowen (*W. E. H.*), and near Derry (*C.*); Ballycastle, Co. Antrim (*Bw.*); near Belfast, abundant (*W.*); and Enniskillen; Crossmolina, Co. Mayo, abundant; Galway (*A.*); Killarney, &c.

Var. *lancea*, St.—"One from Ballycastle" (*Tutt*, Brit. Noct.).

Var. *tripuncta*, Curt.—Occurs at Markree, Co. Sligo; and Buncrana, Co. Donegal.

Var. *hibernica*, St.—Three Rock Mt., Co. Dublin (*Bw.*); Ox Hill range near Dromore West, Sligo; Crossmolina, Mayo; and Killarney.

GRAMMESIA TRIGRAMMICA, *Hufn.*—Widely distributed but decidedly local, being absent from many localities, but sometimes numerous. The pale yellowish grey form is frequent at Drumreaske, Monaghan, and elsewhere; and occasionally there, and in Galway, &c., the ochreous. The var. *obscura*, Tutt (*bilinea*, Haw.), is pretty common at Howth; at Shannon Harbour, King's

Co.; and near Kenmare, Co. Kerry, where it occasionally becomes so dark that all the transverse lines are obliterated, so that the fore wings are of a unicolorous brown. The following are a few localities:—Belfast district, not common; Armagh (*J.*); Castle Bellingham, Co. Louth (*Thornhill*); Farnham, Cavan, scarce; Enniskillen (*Col. Partridge*), scarce; Favour Royal, Co. Tyrone, scarce; Cromlyn (*Mrs. B.*); Westmeath; Markree Castle, Co. Sligo, not rare; and var. *obscura*, Phœnix Park (*C. G. B.*) and elsewhere in Co. Dublin, and Wicklow.

Stilbia anomala, *Haw.*—Chiefly found on the sea-coast, but occasionally inland. Local and sometimes plentiful. Probably very generally distributed on the Irish seaboard. Attracted to light, sugar, and flowers of ragweed. Also sometimes flies in the sunshine. On one occasion, about midday, at Ards House, Co. Donegal, I noticed a sudden flight of these moths, and knocked down one of them with my hat as it rose from the grass beside me. The flight lasted but a very short time. There is but little range of variation shown. Some are of a more dingy coloration than the ordinary type, as at Black Mt., near Belfast, and elsewhere; but very fresh specimens are often of a pale bluish grey on the lower half of the fore wing, with the design very sharply and well drawn in black. There is great diversity in size among the males, some being only a fraction less than 1½ in. in expanse. The females are rarely taken on the wing, and seem always much scarcer than the other sex. Localities:—Cave Hill (*C. G. B.*), and Black Mt., Belfast, abundant; and one at Newcastle, Co. Down (*W.*); Giant's Causeway, abundant (*C.*); Magilligan, Co. Derry; Buncrana, Fanad, and Ards, Co. Donegal; Knocknarea, very abundant (*Russ*), and Lissadell, Co. Sligo; Glandore, Co. Cork (*D.*); Greystones, Co. Wicklow; Howth, at Sutton and the Bailey, abundant. Inland it has been met with at Cappagh, Co. Waterford (*U.*); Ardrahan (*Miss N.*) and Clonbrock one (*R. E. D.*), Co. Galway.

Caradrina morpheus, *Hufn.*—A rare species seldom met with in Ireland and in scanty numbers. The headquarters seem to be Galway, and all the specimens I have seen are similar to the English form, greyish fuscous. Localities:—Powerscourt, Co. Wicklow (B. Supp. Cat.); Dinish and Furinish Islands, Kilkerran Bay (*Lieut. Walker, R.N.*), Ardrahan two (*Miss N.*), Co. Galway; Shannon Harbour, on the verge of that county, and near Kenmare, Co. Kerry; one at Magilligan, Co. Derry (*C.*); one at Castle Bellingham, Co. Louth (*W. B. Thornhill*).

Caradrina alsines, *Brahm.*—Not common. Howth, Co. Dublin; near Sligo, rare (*Russ*); Derry, rare (*C.*), and Magilligan (*R. Curzon*); Clogher Head, Co. Louth, not rare; Tempo, Co. Fermanagh, abundant (*C. Langham*); one at Ardrahan, Co.

Galway (*Harker*); two at Cappagh, and abundant at Minehead, Co. Waterford.

Caradrina taraxaci, *Hb.*—Very generally distributed, but not apparently in great numbers as far as my experience serves. A very dark blackish form occurs occasionally, which near Kenmare, Sneem, Waterville, and other parts of the Kerry coast, and at Dalyston, Co. Galway, appears to become a local variety. I have also met with it at Renvyle, on the Connemara coast; and in Tyrone.

The var. *sordida*, Haw., is occasionally met with.

(To be continued.)

NOTES AND OBSERVATIONS.

The late Mr. Machin's Sale.—My friend Mr. T. W. Hall must surely have been napping when he penned his notes on this sale for the last number of the 'Entomologist.' He says, p. 130:—"Lot 7, which fetched 32/6, as per catalogue, included a pale form of *Euchloë cardamines*, and also a curious variety. The first was a faded male, very old, the colour due only to fading, as the base of the wings exhibited a smoky brown instead of the usual clear grey of fresh specimens; the curious variety was a very poor specimen, and apparently the orange had been removed from the right side, as a few orange scales remained." As a matter of fact these descriptions, except so far as the condition of the specimens is concerned, are absolutely incorrect. The first specimen, a male, is one of those pale-tipped specimens to be found in most collections, but differs from the general run of them in having the nervures within the yellow tip of the usual orange. The difference in the colour of the tips is striking, and could not possibly be caused by fading, any more than an Oxford tie could become a Cambridge one by exposure in a shop-window. From the catalogue, moreover, we know that it was taken by Mr. Machin himself at Ilford, and his own notes describe it as "one pale *cardamines* taken by myself in Cauliflower Lane, Ilford," which proves, if proof were necessary, that it was pale when captured. But it is with regard to the second specimen that Mr. Hall's criticism is so inexplicable. He failed to see that the specimen is set under-side up, so that what he calls the right side is really the left; and has also forgotten that in *cardamines* the black tip to the wing varies in size and shape according to the sex, so that even if the orange had "been removed," the black tip left would have been that of the male, not, as in this case, that of the female. The specimen is really one of those very curious gynandromorphic ones occasionally met with, of which there are scarcely two alike. I append a short description of the specimen as it really is:—Upper side: typical female except for a slight dash of orange on the costal nervure near the tip of the right fore wing; the discoidal spots of equal size. Under side: right fore wing (left as Mr. Hall would describe it) normal male; left fore wing (right *teste* Mr. Hall) normal female, except for slight orange markings on some of the nervures in the region of the tip, and one orange spot below the discoidal spot, which is larger than that of the other wing; secondaries normal female. Mr. Machin's own note of this specimen is, "Unique specimen of *cardamines*, taken by Mr. Bellamy and acquired by purchase." I would ask your insertion of this correction, partly because, in order to save confusion hereafter, I, as purchaser, object to having my specimens so wrongly described; but more particularly because our old friend William Machin should not rest under the imputation of not knowing a variety when he saw one, or of having faked a variety by "removing the orange colour," although I fancy Mr. Hall would find this process easier said than done. Will he try? As regards the remainder of Mr. Hall's note, I will only add that I should much like to see a specimen of *P. phlœas* with "the blue spots forming a conspicuous blue bar," but have little expectation of ever doing so.—C. A. Briggs; 55, Lincoln's Inn Fields, April 11th, 1895.

Plusia chrysitis.—I took a longish series of *P. chrysitis* in 1893, and found that a good many, say a fourth, of the specimens were green-bronze and the rest golden bronze. If I remember right, I pointed this out to Mr. Kane, and I think he said it was worth noting and looking into. So last year I took more, but all were freshly emerged, and I also bred three or four from larvæ. All these examples were of the golden bronze type. Later on, in 1894, I took a few more specimens when they were *passé*, and the majority were green-bronze. I have therefore come to the conclusion that the green-bronze is, so to speak, a fading of the golden bronze. I shall be glad to know if you or your readers can bear me out in this. The two coloured bronzes are quite distinct. — W. D. Thornhill; Castle Cosey, Castle Bellingham, Ireland, March 29th, 1895.

Those "Jumping Eggs."—By permission of Mr. Trimen, I transcribe from his letters to me his remarks on these so-called "eggs," which will, I am sure, be of interest to the readers of the 'Entomologist.' In reference to what has already appeared in the 'Entomologist' for March and in previous numbers, Mr. Trimen says:—"It is clear that Mr. Bignell is disposed to think that the larva of our 'eggs' from the taai bosch (a *Rhus*) will turn out to be some *parasite* on the maker of the gall-like swellings on the leaves and terminal shoots. I do not think that our Cape larva is a parasite, but the original and proper occupant of the swelling, and the maker of the little egg-like 'cocoon,' because, although I have opened a considerable number of the galls and examined the occupants, I have never found anything but the same species of larva (of different sizes), and no remains whatever of a previous inhabitant that had been devoured or sucked to death. (Where parasitic larvæ have eaten the rightful inhabitant, one always finds the skin or harder parts of the victim lying round the intruder.) I do not feel certain yet whether our insect is hymenopterous or coleopterous, but incline to think it the latter, as does also Mr. Péringuey; and I note that you say Mr. Waterhouse also regards it as probably that of a weevil. Mr. Bignell's very interesting case of the jumping cocoon of the ichneumon is altogether distinct from ours, for he shows that the larva, when full-fed in the *Noctua* caterpillar on which it preys, leaves the victim, hangs by a silken thread, and spins its cocoon at the end of the thread; soon afterwards the thread breaks, the cocoon falls to the ground, and then begins the jumping of the cocoon from the jerks of the larva within. Our fellow is absolutely jammed between the upper and lower membranes of the leaf, and certainly does not escape from the withering or fall of the latter, as far as can be judged from branches of the taai bosch kept indoors. These larvæ are evidently of very slow growth, and this is how they have so puzzled us; for you may keep them *au naturel*, or only in the extracted 'cocoon' or 'shell' (of course this is only termed an 'egg' in common parlance from its appearance), for weeks and months, and they will not '*turn*' into the perfect insect. I know I got quite annoyed with the persistent ticking, day after day, of the free 'eggs,' as they untiringly jumped and jumped in their boxes. I cannot see how the little fellows can get a chance of jumping under natural conditions; what is to set free the shell which holds one from the closely-investing leaf-membranes? Of course, *when the perfect insect is developed*, it must have the means of effecting its egress through both cocoon and leaf; but such cases abound throughout the insect world. The difficulty in our fellow is why such fine saltatory powers should be possessed by a grub which to all appearance would in nature never have a chance of exercising them; and the question arises whether, after all, the jumping is anything more than an accident due to the vigorous twists of the larva resenting the removal from its natural investing leaf. Possibly, indeed, the larva may habitually indulge in the same muscular exercise during its normal condition of complete imprisonment in both 'cocoon' and investing leaf. Until somebody has the time and patience to sit down steadily to the task of tracing out the whole history of the taai bosch grub from first to last, we can only guess at what is probable." In conclusion, Mr. Trimen affirms that "at present there is so very little known or proved about it that until some definite facts as to its life-history come to hand it is impossible to speak with certainty."—Catherine C. Hopley; 42, Haggard Road, Twickenham.

"*Re* a Hunt for Phorodesma smaragdaria."—Acting on Mr. Elisha's advice (*ante*, p. 130), I have looked up his "correct accounts" of *Phorodesma smaragdaria*, and I hope I have read them with more care than he seems to have bestowed on my narrative of a hunt for the same species. In the 'Transactions' of the Entomological Society of London (1886, p. 467), Mr. Elisha refers to his previous record (Entom. xvii. 235) by saying, "As stated in that note, I did not then know what the larva fed on." We turn to Entom. xvii. 235, and read, "It is now three years since I first went after this larva, and many long and fruitless journeys I have had since that time, extending over miles of ground in every direction on the salterns. Year after year I was searching the wrong plants"; and further on in the same note he remarks, "Now I know its food-plant I am in hope of filling my series, although I am inclined to think that will be no easy matter, for I had quite two hours' collecting after I had taken this larva, but failed to take another. *The exact locality and the food-plant I must for obvious reasons at present decline to state*," &c. My paper was intended to give both locality and food-plant, so that any entomologist wishing to obtain *P. smaragdaria* might do so without experiencing all the inconvenience which Mr. Elisha seems to have suffered. It was also my wish to add further facts in the natural history of the species. Fobbing Marsh, near Pitsea, is where our late respected fellow-worker, Mr. Machin, was followed by a number of collectors who thought it worth their while to obtain the knowledge of the food-plant of *P. smaragdaria* by such means. I regret that the mention of the name of the discoverer of the larva in this country should have caused "keen annoyance." In my anecdote I made no allusion to any one by name, but merely gave it as "a story" handed down by tradition; and how my words could have been construed into an attack on the late Mr. Machin I am quite at a loss to understand.—Henry A. Auld; 31, Belmont Hill, Lee, S.E., April 8th, 1895.

[Although Mr. Elisha did not mention the name of the food-plant of the larva in his note on *P. smaragdaria* in 1884 (Entom xvii. 235), he did so in his account of the life-history of the species ('Transactions' of the Entomological Society, 1886, p. 467).—Ed.]

Note on Vanessa io.—Hybernated imagines of *Vanessa io* were quite in evidence, flitting about the grassy slope to the beach at Claremont Park, Blackpool, Lancashire, on April 13th and 14th. I was pointing one out with my stick to a friend as it was sunning itself, with lazily moving half-opened wings, and not seeming to see or care, till the shadow of my stick passed over it, when it immediately flew and alighted on the grass a little farther on, where I repeated the experiment with exactly the same result.—John Watson; 94, George Street, Alexandra Park, Manchester.

CAPTURES AND FIELD REPORTS.

Collecting in Wales, 1894.—I spent the first three weeks of last July at Barmouth, and although the weather was not particularly favourable, still I managed to get about seventy different species of Lepidoptera. The first few days *Argynnis selene* and *Lycæna ægon* were very common, but in bad condition. *A. adippe* was scarce; I only saw a very few. *A. paphia* was not out; but *A. aglaia*, after the 10th of the month, was simply swarming everywhere; it was no uncommon thing to see as many as twenty flying at a time. *Macroglossa stellatarum* was common hovering over the red valerian. *Nola mundana* was settling about on different walls, or flying gently at dusk. *Lithosia lurideola*, a few at dusk. *Bombyx rubi* larvæ were about half grown, feeding on heath on most of the mountain sides; whilst the larvæ of *Eupithecia pulchellata*, in all stages of growth, could be taken from every foxglove, and, as usual, more than three-fourths of them were ichneumoned. *E. venosata* larvæ were nearly as common in the *Silene*, and nearly as badly ichneumoned. With these latter were also larvæ of *Dianthœcia capsincola* and *D. carpophaga*. The imagines of *E. constrictata* were found commonly at rest on the stone walls, and also easily disturbed from their food-plant, the wild thyme, which grows so abundantly on all the mountain sides. I got a fine series of this insect and also about 250 eggs. The larvæ hatched out by the end of July, and although placed upon living plants I only got three into pupæ; most of them were nearly full grown, and then they died off rapidly. Mr. Carrington

(Entom. xviii. 142) mentions that they are not easy to rear. *Acidalia marginepunctata*, *A. subsericeata*, *Emmelesia minorata*, *E. decolorata*, *E. affinitata*, *E. alchemillata*, *Venusia cambrica*, and *Abraxas ulmata* all turned up in tolerable numbers. *Tanagra atrata* was out in splendid condition on July 3rd, but very worn on the 9th. The best insect that I took was *A. contiguaria;* I caught six one evening on the wing without moving, and although I tried the same place on several evenings afterwards, I did not get any more there, but found another at rest about two miles away. No doubt, had I known the right way to work for this species, I should have got plenty of it; perhaps some readers of this note can give me a hint or two, as I shall most likely go to the same spot again this summer. *Melanippe galiata*, *Eubolia palumbaria*, and *Pseudoterpna pruinata* were all common; so also were *Pyrausta ostrinalis* and *Herbula cespitalis;* a few *Ennychia cingulata* were taken, also *Scoparia cembræ* and *S. mercurella*. The only "plume" was *Aciptilia tetradactyla*, whilst the Crambites were represented by *Crambus falsellus*, *C. pascuellus*, *C. culmellus*, *C. inquinatellus*, *Pempelia palumbella*, *Rhodophæa consociella*, *C. perlellus* with its variety *warringtonellus* and other forms; the last-named species was exceedingly variable. As I did not try sugar I obtained nothing of any note among the Noctuæ. From the foregoing notes it will be seen that although no rare species was taken, a fair variety of insects was obtained, and in my opinion there are many worse places to spend an entomological holiday at than Barmouth. I hope at a future time to send a report of my visit there this summer.—J. N. Kenward; Rosslyn, New Eltham, Kent.

Notes from Reading.—On Jan. 19th *Hybernia rupicapraria;* on the 20th, *Phigalia pedaria* (*pilosaria*) and *Hybernia leucophæaria* were out here; I did not see any more until Feb. 24th, when I took five *H. leucophæaria* and three *Anisopteryx æscularia*, just emerged, hanging up on an old fence drying their wings. On March 17th two *Hybernia marginaria* (*progemmaria*); also one male *Nyssia hispidaria*, the first I have ever taken in this district, but I had one female come out in my breeding-cage last spring from pupa dug here.—W. E. Butler; Hayling House, Reading.

Rare Lepidoptera in Surrey.—Though rather late, I wish to record the capture of *Deiopeia pulchella* and *Argynnis latona* at Brighton in 1892. —H. U. Edelsten; The Elms, Forty Hill, Enfield.

Notes on the Early Moths.—On March 16th I went to Delamere Forest to try and get a female *Nyssia hispidaria*. Very few signs indeed of spring were visible as the train sped on its way by field and pond. Pastures were brown and bare; tiny catkins were only beginning to show on the willows, and the Forest appeared as sad and desolate as winter could make it. I had scarcely been half an hour in the wood before I found the object of my search—a female *N. hispidaria*, the nearly black form—but it was the only representative of the species I came across. *Anisopteryx æscularia* was fairly common, perhaps two dozen altogether. Neither was *Hybernia leucophæaria* more plentiful, but I had the luck to take a specimen almost black. *Phigalia pedaria* (*pilosaria*) reached three specimens only; one example is marked across the upper wings with bold dark bars. A crippled *Larentia multistrigaria* completed my list of captures, all of which were taken at rest off oak trunks excepting the *L. multistrigaria*, which I picked from a railing. On March 23rd I went again to Delamere Forest. The fields were green after a fine week of spring weather. Coltsfoot began to show its yellow flowers, and the snowdrops (very late this year) were joined in the gardens by crocuses in full blossom. Shortly after entering the Forest I took a fine female *Asphalia flavicornis* at rest on an oak; but it soon became evident I was too late for the early moths, except the sombre little *Tortricodes hyemana*. *A. æscularia* I did not see at all, and only a few specimens of *H. leucophæaria* were observed. Collectors who want *A. flavicornis* should search low and rather isolated birches in June and July. They will find the caterpillar commonly enough, each inside a folded leaf. Yet the moth is seldom found in spring! My best insect was a female *H. leucophæaria*, from which I shall try to breed, as the males are of all shades and patterns at Delamere, ranging from entirely black, or black-brown, to the type. The female is wingless, white, well spotted with black, and about the size of the female *H. marginaria* (*progemmaria*). The largest spots are arranged in two dorsal rows. The females vary much, but the description I give seems to usually hold good. Of *N. hispidaria* I took only one specimen, a dark male. In some seasons this is a difficult insect to time, and the present one is an example. Two female *H. marginaria* complete my list; they differ very much in size, although full of eggs, one being about twice the size of the other, and with remarkably large wings for a female. The basal half of each wing is almost blackened by two dark curved and transverse shades. What a puzzle that the larvæ of wingless species, even in the earliest stages, should be so widely distributed among the trees, and even at the ends of the branches! The females are sluggish, and incapable of such a distribution. The solution appears to be that the males absolutely carry up the females! (Entom. xxvi. 20). Throughout the day a breeze blew from the south-west, bringing rain at two p.m. All my specimens, except one of three *P. pedaria* which I forgot to mention, were taken from the sides of oaks away from the wind, that is, from the sides facing north and east.—J. ARKLE; Chester.

NOTES FROM AYSGARTH, POOLE.—The Tæniocampas have turned up pretty well at the sallow blossoms in this locality; *T. munda*, *T. cruda*, *T. instabilis*, and *T. gothica* are fairly plentiful. On Sunday, April 7th, they swarmed; I saw hundreds, but did not take any. On April 11th I took *Selenia lunaria* in the park here, and also *Eupithecia subumbrata.*—W. PARKINSON CURTIS; Aysgarth, Poole, April 14th, 1895.

NYSSIA LAPPONARIA IN SCOTLAND.—Mr. W. M. Christy informs me that he has lately bred some specimens of *N. lapponaria* from larvæ taken by himself in Scotland last year. I am pleased to add that he has obtained some ova, and that he has kindly promised that if he is successful in getting the species through all its stages he will give us an account of its life-history. The only British example of *N. lapponaria* that we know anything about is the one taken by Mr. Meek's collector at Rannoch in the spring of 1871. From Mr. Meek this unique specimen went into the collection of the late Mr. Roper Curzon (Entom. v. 311), and subsequently found its way into the possession of the late Mr. Philip Harper. On the death of the last-named gentleman it was sold at Stevens's for, I believe, £14, and ultimately passed into the collection of Mr. Clarence Fry, where, if my information is correct, it still remains. *N. lapponaria* is stated to be found on the Continent only in Lapland and the Upper Engadine. Staudinger considers this insect may probably be an alpine and boreal form of *N. pomonaria*, which occurs in Germany, Switzerland, North-west France, Livonia, Finland, and Lapland; and I also incline to this view.—RICHARD SOUTH; Oxford Road, Macclesfield.

NOTES FROM FOREIGN PERIODICALS.

Hermaphrodites of Saturnia carpini.—In the spring of 1889, a resident in Bonn found, in the neighbourhood of that city, a large female of *Saturnia carpini*, which subsequently deposited a great number of eggs. Over one hundred imagines emerged the following spring, only distinguishable from captured specimens by their slightly smaller size. A few pupæ remained over until the next spring, when imagines appeared from them about the usual date. Among these latter were no less than six hermaphrodites, of which three are now in the author's collection, and he has seen the fourth; while enquiries established beyond doubt the hermaphrodite character of the remaining two. The author describes three of the six varieties as follows:—The fourth specimen alluded to above is a perfect hermaphrodite, the body being exactly divided from the head to the tail into two halves, showing respectively male and female characters, which include even the genitalia. The wings are very curiously divided in a diagonal manner thus:—The right fore wing and the left hind wing have male coloration, and the left fore wing and the right hind wing are coloured as in the female. The male and female wings, as well as being different in colour, have the usual sexual disparity in size, giving the specimen, which is well developed and as big as a middle-sized female, a very curious and beautiful appearance. The second specimen is a faultless female, of middle size, having both antennæ pectinated as in the male; the costal border of the right fore and hind wings are decidedly male, with orange coloration. The third is a very interesting form; on the upper surface of all four wings the coloration is male, but the right wings are considerably larger than is usual in the male. The right wings are greyish below as in the female, while the left wings have male colours on the under surface. The abdomen and thorax are of the male form, though the former is swollen with eggs, which can clearly be seen through the spaces between the segments. The genitalia are completely divided into male and female, the male ancillaries being very strong and larger than usual. Unfortunately the left wings of this specimen are not fully developed; still, if one regards them as full-grown they would scarcely cover three-quarters of the area of the right (female, under side).—(Carl Frings in *Societas Entomologica*, No. 23, p. 182.) W. M.

OBITUARY.

Mr. J. Mortimer Adye, we regret to learn, died at Bournemouth on March 30th, 1895. The deceased, who was only 35 years of age, was well known as a collector of Lepidoptera, especially of the species occurring in the New Forest district. He was elected a member of the South London Entomological and Natural History Society in 1886, and a Fellow of the Entomological Society of London in 1891.

Societies.—Want of space obliges us to defer the publication of the Reports of Societies until June.

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NOTES ON VARIOUS SPECIES INCLUDED IN VOL. II. OF MR. BARRETT'S 'LEPIDOPTERA OF THE BRITISH ISLANDS.'

By W. F. KIRBY, F.L.S., F.E.S., &c.

SPHINX PINASTRI.—It is curious to notice how completely a conspicuous species may be lost sight of for many years and placed in our supplementary lists as "introduced without authority," and subsequently reinstated on its being discovered that it had actually been "omitted from the British list without authority" instead. It is true that the older authors introduced North American and other foreign insects into their lists, some of which at least had apparently been accidentally imported into England in a living state; but in the early years of the present century there was but little communication between England and the continent of Europe, and many, perhaps most, of the European species *likely to occur in England* and stated to be British by the older authors, and subsequently doubted, have now been reinstated in our lists.

DEILEPHILA LIVORNICA.—Mr. Barrett has fallen into a curious error respecting *D. lineata*, which he first notices as a variety of *D. livornica*, and then, in the next paragraph, as a distinct species, under the name of *D. daucus*.

SESIIDÆ.—With further information respecting their habits, these Clearwings have been more freely taken or reared in England, though one or two, including the large and conspicuous *Sesia asiliformis*, still remain excessively rare. We believe that the alleged occurrence of *S. scoliæformis* in Ireland is now fully confirmed.

ZYGÆNIDÆ.—Mr. Barrett's observations on the burnet moths (*Zygæna*) will be read with much interest. He remarks that no locality for *Z. minos* is known in England; but we may mention that some years ago specimens of a *Zygæna* captured at Tintagel in Cornwall were announced as *minos*, and subsequently submitted to the late Mr. Birchall, who decided that they were not *minos;* but he was unable to say what they were. Cornwall would, however, be a very probable locality for the insect to be found; but we are not aware that the matter has yet been investigated.

Among the species casually taken in England is *Syntomis phegea.* It is a Mediterranean species, extremely local in Central Europe north of the Alps, though it may be extending its range in that direction. Being a gregarious day-flying species, found settling on tall flowers, or flying about bushes, the specimens taken singly in England can only have been casual importations.

CALLIMORPHA HERA.—This species is probably a recent introduction to the country. It is a day-flying moth, long known as an inhabitant of the Channel Islands, and latterly found in some quantity in Devonshire. Entomologists, unlike botanists, do not recognise the Channel Islands as part of the British Islands, and hence this species had to wait its turn to take its place in our British lists.

DEIOPEIA PULCHELLA.—The comparatively large number of specimens of this species which have been taken in England of late years, as compared with its former excessive rarity as a British species, illustrates the present tendency of the Mediterranean fauna to extend its limits northwards along the coasts of Western Europe. *D. pulchella* is an almost ubiquitous species in the warmer parts of the Old World.

ON THE REARRANGEMENT OF THE FABRICIAN GENUS *COLIAS*, AND THE PROPOSAL OF A NEW GENUS OF PIERINÆ.

By JOHN WATSON.

THE secondary sexual characters of Rhopalocera have always been of the utmost importance in classification, possessing as they do such constant lines of demarcation of genera, and being as constant as any system of classification based upon neuration alone; and though I do not wish it to be thought I desire to extol an arrangement based upon these characters alone, above one on neuration, yet at the same time the consistency of such an arrangement is undoubted, and more particularly where it applies to such a heteromorphic collection of species as are at present included in the Fabrician genus *Colias.*

This fact has never been brought home to me more forcibly than when checking my arrangement of this genus with that of Mr. Kirby's 'Catalogue of Diurnal Lepidoptera'; and a careful examination of my own and other collections of palæarctic Rhopalocera brings me to the conclusion that the assemblage of species hitherto classed as *Colias* resolve themselves into two natural genera, and for this purpose I propose the founding of a new genus. According to Mr. Kirby (*l. c.*), we find *thisoa*, Mén., placed between two species, each as generically distinct from it (however similar they may be in coloration) as *fieldii*, Mén., and *aurora*, Esp.

In founding this new genus of Pierinæ, I am not unmindful of the fact that the old genus should be retained to include the earlier species, and this I have done in retaining *palæno*, Lin. ('Faun. Suecica,' p. 1041), in the genus *Colias*, and making *edusa*, Fab., the type of my new genus.

ERIOCOLIAS, gen. nov.

Allied to *Meganostoma*, Reak. Male with a black or rufous-black band on outer margins of primaries and secondaries, never spotted as in the female, but often traversed along the nervures by faint streaks of the ground colour; having on the superior surface of secondaries, between the costal and subcostal nervures, a patch of modified scales of a smaller size, and much more crowded than the surrounding ones, usually of the same ground colour. Females similar to those of *Colias* proper. Type, *edusa*, Fab. Other species which fall into this genus are: *myrmidone*, Esp.; *fieldii*, Mén.; *vautierii*, Guér.; *meadii*, Edw.; &c.

After the separation of *Eriocolias*, it will be found that the species of the old genus arrange naturally into two groups, which may eventually be generically separated; but as yet I fancy this cannot be done satisfactorily till we know more of the local forms of some of the more arctic species allied to *palæno*, *pelidne*, *philodice*, and *eurytheme*. I have varieties of *eurytheme*, Bois., and *philodice*, Godt., which approach *pelidne*, Bois., very closely; and I have transitional varieties between *eurytheme* and *keewaydin*, and *eurytheme* and *ariadne*, both varieties taken along with *eurytheme* in the mountains of Nevada at 7000 feet altitude.

The two groups into which *Colias*, Fab., resolve themselves are:—

I. Males having the bands as in *Eriocolias*, but the basal patch of scales as found in *Eriocolias* being absent. Females with a more or less complete row of spots situated in the internervular spaces along the border of primaries and secondaries, but as the marginal fascia of secondaries is not usually so broad as that on the primaries, the inner portions of the spots are indistinct and suffused, except in abnormally dark varieties. Type of this group is *chrysotheme*, Esp.; others in the group being *thisoa*, Mén.; *eurytheme*, Bois.; *keewaydin*, Edw.

II. Males and females similarly marked, the black fascia on all wings spotted, but rather more regularly than in the females of group I. Type, *phicomene*, Esp. Others in the section are—*hyale*, Lin.; *palæno*, Lin.

I had at first thought that *palæno* should be made the type of another section, as it differs from group II. in having both sexes with an unspotted fascia; but however different it may be from *hyale* in typical specimens in this respect, the connecting link to the rest of the group is made by the female variety *werdandii*, Herr-Schaff., which has a faintly-spotted marginal fascia; and as the chief characteristic of this group is the similarity of both sexes, I place *palæno* here.

The genus *Eriocolias*, however, affords a very sharp character of definition by its possession of the interesting secondary sexual character, the congested scale area on costal margin of secondaries; there is one point to which I might call attention in regard to these secondary sexual characters, and that is their constancy. I have only seen one specimen of *Eriocolias* which is without it, and that is a specimen of *E. fieldii*, Mén., in my collection from the N. W. Himalayas. This was received along with other typical specimens, and is in all respects (except the absence of the scale patch) perfectly typical. This aberration is equalled, but in an entirely opposite manner, by a male specimen of the Indian *Papilio paris*, Lin., in my collection, which has on the first median nervule (but in a less pronounced manner) the characteristic androconia normally found on median and submedian nervules of superior surface of primaries of *P. ganesa*, a species which is found flying in company with *P. paris*. It will be noticed that this streak of dark brown filamentous scales is found only on the nervule of *paris*, which is in *ganesa* and its allies the most endowed with this type of a secondary sexual character.

LIFE-HISTORY OF *TENTHREDOPSIS MICROCEPHALA*.

By Miss Chawner.

On the 8th of May, 1893, I captured two females of *Tenthredopsis microcephala*, and placed them with some live turf in a case I use for the purpose of breeding sawflies. No other flies were confined there while the *T. microcephala* were in it. The turf was composed of grass- and buttercup-roots. The next few days being dull, the flies remained apparently torpid, but May 15th was brighter, and they became lively, examining the turf, and evidently seeking a suitable leaf on which to oviposit. The result I copy from notes taken at the time.

May 15th, 1893.—One fly laid an egg on the under side of a buttercup-leaf, near but not touching one of the large ribs. Egg oval, brownish, in the centre of a largish blister. 16th–20th.—Several eggs laid daily, about twenty in all; two or three often close together on one leaf. 29th–31st.—Larvæ hatching. Length just under two lines, back deep bluish grey, sides and under sides greenish white. Vertex of head deep brown, face pale, eyes black, twenty-two legs, prolegs and claspers pale, claws brown. Larvæ eat irregular holes in the leaves, avoiding the large ribs, are sluggish, but not timid, lying curled up on the under side of leaves; after their first meal they develop a kind of *ardoisé* bloom. The eggs darkened in colour considerably about two days before hatching.

June 3rd–6th.—Larvæ much grown, have moulted, and appear bluish grey, with very dark if not quite black heads; *ardoisé* bloom over the whole body, which, when rubbed, shows a grey-green, semi-transparent skin; body cylindrical, not wrinkled, but striated under the bloom; dorsal line inconspicuous. They eat voraciously, chiefly at evening, lying curled up during the heat of the day. 8th–12th.—Larvæ moulted and came out green with dull olive stripes and olive dorsal line; head dark, especially on vertex; shape much thickened. In this stage they are shy, falling off the leaf if touched or alarmed, and ejecting a brown acrid liquid plentifully from their mouths. Length from 11–13 lines. 15th–22nd.—Larvæ moulted for the last time, appearing bright green all over, and ceased to eject liquid. Length 10–12 lines. They went down into earth, not spinning a cocoon, but lying in a cell of earth, very smooth inside, but crumbling as soon as handled. Seventeen went down.

March 20th, 1894.—Larvæ changed to emerald green pupæ.

April 2nd.—Pupæ turned black. 4th–6th.—Ten female flies hatched. 10th–12th.—Virgin eggs laid on buttercup-leaves. 13th.—One male fly hatched; it differed from the females in having the third and fourth segments of the abdomen dull red.

May 10th.—Eggs hatching, probably retarded by the wet, cold season. 21st–28th.—Several larvæ dwindled and died.

June 7th.—Larvæ turned green. 22nd.—The seven survivors went down into earth.

April 10th, 1895.—Two larvæ only survived the winter, these have now pupated. 22nd.—One male fly appeared, small, about seven lines, having red segments on the abdomen.

In Mr. Cameron's account of the Tenthredopsides (Phytoph. Hymenopt., vol. i. p. 102), it is stated that none of the larvæ are known; it is therefore much to be wished that this neglected group might attract more attention, as it is evidently not difficult to induce the females to deposit eggs, nor does it require much trouble to rear the larvæ. I have found larvæ of *Tenthredopsis microcephala* on cultivated chrysanthemum, and one of my flies laid eggs on a leaf of premorse scabious which had accidentally been placed in the case, but the eggs came to nothing.

Forest Bank, Lyndhurst.

A CATALOGUE OF THE MACRO-LEPIDOPTERA OF DERBYSHIRE.

By Fred. W. G. Payne.

(Concluded from p. 120.)

Uropteryx sambucaria. Common as regards the south; rarer at Bakewell.

Epione apiciaria. Repton, Winshill, Bretby, Barrow, Osmaston, and Little Eaton.—*E. advenaria*. Willington (E. Brown).

Rumia luteolata, L., = *cratægata*, L. Abundant everywhere.

Venilia macularia. Bakewell and Dovedale.

Metrocampa margaritaria. In fair numbers everywhere.

Ellopia prosapiaria, L., = *fasciaria*, Schiff. Breadsall.

Eurymene dolobraria. Repton, Derby, Barrow, and Ashbourn.

Pericallia syringaria. Barrow and Derby.

Selenia bilunaria, Esp., = *illunaria*, Hb. Common everywhere.—Var. *juliaria*. Has been taken by Rev. G. A. Smallwood.—*S. lunaria*. Occasionally taken.—*S. tetralunaria*, Hufn., = *illustraria*, Hb. Osmaston.

Odontopera bidentata. Common.

Crocallis elinguaria. Common.

Ennomos alniaria, L., = *tiliaria*, Bork. Ashbourn.—*E. fuscantaria*. Egginton, Derby, and Barrow.—*E. erosaria*. Larvæ at Repton Shrubs (Mr. Baker). Also recorded by Mr. Hill.—*E. quercinaria*, Hufn., = *angularia*, Bork. Repton Shrubs and Bretby Park.

Himera pennaria. Bakewell, Repton, and Barrow.

Phigalia pedaria, Fb., = *pilosaria*, Hb. Common throughout the county.

Nyssia hispidaria. Rare. Repton Shrubs.

Amphidasys strataria, Hufn., = *prodromaria*, Schiff. Repton, Findern, Newton, and Drakelow.—*A. betularia*. Common throughout the county.—Var. *doubledayaria*. Common almost everywhere.

Hemerophila abruptaria. Willington and Osmaston.

Cleora lichenaria. Recorded once (Rev. R. H. Fuller).

Boarmia repandata. Common.—*B. gemmaria*, Brahm., = *rhomboidaria*, Hb. Common throughout the county.—Var. *perfumaria*. Has been taken by Rev. G. A. Smallwood.

Tephrosia crepuscularia. Barrow. Common (Rev. R. H. Fuller).—*T. biundularia*, Bork., = *laricaria*, Dbl. Frequent south.—*T. punctularia*. Common in the southern districts.

Pseudoterpna pruinata, Hufn., = *cytisaria*, Schiff. Willington.

Geometra papilionaria. Repton, Willington, Derby, Cauldwell, and Barrow.

Phorodesma pustulata, Hufn., = *bajularia*, Schiff. Derbyshire (Newman).

Iodis lactearia. Common in the south, and of less frequent occurrence north.

Hemithea strigata, Müll., = *thymiaria*, Gn. Ashbourn.

Ephyra punctaria. Repton Shrubs and near Ashbourn.

Asthena luteata. Derby and Repton.—*A. candidata*. Common.—*A. sylvata*. Repton.—*A. blomeri*, Curt., = *pulchraria*, Ev. Bakewell, once (Rev. R. H. Fuller); once near Repton (W. Garneys), Hartshorn (T. Gibbs), Bakewell (Rev. C. F. Thornewill), Dovedale (J. Hill).

Eupisteria obliterata, Hufn., = *heparata*, Haw. Common in the southern portions of the county.

Acidalia dimidiata, Hufn., = *scutulata*, Bork. Common everywhere. —*A. bisetata*. Common in the south.—*A. virgularia*, Hb., = *incanaria*, Hb. Everywhere in the county.—*A. subsericeata*, Dovedale.—*A. immutata*. Recorded by Mr. Hill.—*A. remutaria*. Fairly numerous. —*A. fumata*. Dovedale.—*A. imitaria*. Barrow and Derby.—*A. aversata*. Common in the south.—*A. emarginata*. Barrow.

Timandra amataria. Fairly numerous in the south.

Cabera pusaria. Very common almost everywhere.—*C. exanthemata*. Almost everywhere.

Bapta temerata. Scarce (W. Garneys).

Macaria liturata. Seal Wood and Breadsall.

Halia vauaria, L., = *wavaria*, Fb. Common everywhere.

Strenia clathrata. Recorded once (Rev. R. H. Fuller).

Panagra petraria. Willington, Bretby Park, Repton, Breadsall, and Bakewell.

Numeria pulveraria. Once near Bretby (T. Gibbs); Breadsall (G. Baker).

Ematurga atomaria. Common everywhere in the county.

Bupalus piniaria. Common everywhere.—Var. *flavescens*. Breadsall Moor, common (G. Baker).

Abraxas grossulariata.—*A. sylvata*, Scop., = *ulmata*, Fb. Common throughout the county.

Ligdia adustata. Recorded by Rev. G. A. Smallwood.

Lomaspilis marginata. Everywhere.

Hybernia rupicapraria.—*H. leucophæaria*.—*H. aurantiaria*.—*H. marginaria*, Bork., = *progemmaria*, Hb.—*H. defoliaria*. Common throughout.

Anisopteryx æscularia. Common.

Cheimatobia brumata. Abundant everywhere.—*C. boreata*. Bakewell and Repton Shrubs.

Oporabia dilutata. Everywhere.

Larentia didymata. Abundant.—*L. multistrigaria*. Bakewell and Breadsall.—*L. cæsiata*. Common (Miss E. M. Alderson). Recorded twice (Rev. R. H. Fuller). Dovedale, common (H. F. Gibson).—*L. salicata*. Once at Bakewell (Rev. C. F. Thornewill).—*L. viridaria*, Fb., = *pectinitaria*, Fues. Abundant everywhere in the county.

Emmelesia affinitata. Common everywhere.—*E. alchemillata*. Occasionally in the south.—*E. albulata*. Abundant throughout the county.—*E. decolorata*. Common south.—*E. tæniata*. Dovedale (F. M. Spilsbury).

Eupithecia venosata. Repton, Little Eaton, Bakewell.—*E. linariata*. Frequent in the south of the county.—*E. pulchellata*. Common.—*E. oblongata*, Thnb., = *centaureata*, Fb. Repton Shrubs and Derby.—*E. subfulvata*. Winshill, Barrow, and Little Eaton.—*E. plumbeolata*. Common at Little Eaton.—*E. isogrammaria*, H.-S., = *haworthiata*, Dbl. Breadsall and Derby.—*E. pygmæata*. Recorded once, Bakewell (Rev. R. H. Fuller); Lathkil Dale and Bakewell (Rev. C. F. Thornewill); Wirksworth (Mr. J. Hill).—*E. castigata*. Common in the south.—

E. trisignaria. Repton Shrubs, common (Mr. G. Baker). Also recorded by Mr. J. Hill and Rev. G. A. Smallwood.—*E. fraxinata.* Derby, Barrow, and Willington.—*E. pimpinellata*, Hb.,=*denotata*, Gn. Not common, Derby.—*E. valerianata*, Hb.,=*viminata*, Dbl. Repton Shrubs, common (Mr. G. Baker); Kedleston Park (Rev. C. F. Thornewill). Also at Derby.—*E. indigata.* Breadsall (Mr. Hill and Mr. Baker); Bakewell (Rev. C. F. Thornewill).—*E. nanata.* Breadsall (Mr. Baker).—*E. subnotata.* Common in south-west.—*E. vulgata.* Fairly common almost everywhere.—*E. albipunctata.* Repton Shrubs and Breadsall, common (Mr. Baker).—*E. absinthiata.* Common.—*E. minutata.* Breadsall, common (Mr. Baker).—*E. assimilata.* Occurs throughout the county.—*E. tenuiata.* Repton and Breadsall.—*E. lariciata.* Bretby, Seal Wood, Breadsall, Bakewell, and Hartshorn.—*E. abbreviata.* Repton Shrubs.—*E. exiguata.* Common south.—*E. sobrinata.* Derby.—*E. pumilata.* Derby.—*E. rectangulata.* Common everywhere south of Bakewell.

Lobophora halterata, Hufn.,=*hexapterata*, Schiff. Repton Shrubs.

Thera variata. Breadsall.—*T. firmata.* Recorded by Mr. J. Hill.

Hypsipetes ruberata. Hartshorn and Winshill.—*H. trifasciata*, Bork.,=*impluviata*, Hb. Repton, Barrow, and Breadsall.—*H. sordidata*, Fb.,=*elutata*, Hb. Common in the south.

Melanthia bicolorata, Hufn.,=*rubiginata*, Fb. Seal Wood, Repton, Barrow.—*M. ocellata.* Bretby, Barrow, and Breadsall.—*M. albicillata.* Repton Shrubs, Seal Wood, Bretby, Ashbourn, Ambergate.

Melanippe hastata. Seal Wood.—*M. tristata.* Bakewell, common. *M. sociata*, Bork., = *subtristata*, Haw. Abundant throughout.—*M. montanata.* Abundant everywhere south.—*M. galiata.* Rare, Breadsall.—*M. fluctuata.* Common everywhere.

Anticlea rubidata. Barrow (Rev. G. A. Smallwood).—*A. badiata.* Common as far north as Bakewell.—*A. nigrofasciaria*, Göze.,=*derivata*, Bork. Fairly common everywhere.

Coremia designata, Hufn.,=*propugnata*, Fb. Common.—*C. ferrugata.* Fairly common.—*C. unidentaria.* Common in the south-west.

Camptogramma bilineata. Everywhere.—*C. fluviata*, Hb.,=*gemmata*, Hb. Specimens have been taken near Willington. Newman says single specimens have been taken at Derby.

Phibalapteryx vittata, Bork.,=*lignata*, Hb. Willington and Little Eaton.

Triphosa dubitata. Common everywhere.

Eucosmia certata. One at Barrow (Rev. G. A. Smallwood); Bakewell (Rev. C. F. Thornewill and Rev. R. H. Fuller).

Scotosia rhamnata. Dovedale.

Cidaria miata. Bakewell and Dovedale.—*C. corylata.* Common throughout the county.—*C. truncata*, Hufn.,=*russata*, Bork.—*C. immanata.*—*C. suffumata.* Common throughout the south of the county.—*C. silaceata.* Common south, rarer north.—*C. prunata*, L.,=*ribesiaria*, Bdv. Common everywhere.—*C. testata.* Common south.—*C. populata.* Occurs throughout the county, even on Kinderscout.—*C. fulvata.* Everywhere.—*C. dotata*, L.,=*pyraliata*, Fb. Barrow and Bretby.—*C. associata*, Bork.,=*dotata*, Gn. Occurs in the southern districts.

Pelurga comitata. Stapenhill, Chellaston, and Willington.

Eubolia cervinata. Barrow.—*E. limitata*, Scop.,=*mensuraria*, Schiff

Fairly common south.—*E. plumbaria*, Fb.,=*palumbaria*, Bork. Dovedale, Barrow, and Breadsall.—*E. bipunctaria*. Fairly common in the north, unrecorded from the south.

Carsia paludata. Dovedale, rare.

Anaitis plagiata. Common throughout the county.

Chesias spartiata. Fairly common south.

Tanagra atrata, L.,=*chærophyllata*, L. Abundant throughout the length and breadth of the county.

Hughenden House, Derby, April 8th, 1895.

NOTES ON THE NEW ZEALAND VEGETABLE CATERPILLAR (*CORDICEPS ROBERTSII*).

During the last ten years some interesting notes have appeared in British and continental entomological periodicals on the New Zealand vegetable caterpillar. The following abstract of a paper by Sir Walter Buller, F.R.S., read before the Wellington Philosophical Society, February 20th, 1895, will add considerably to our knowledge of this peculiar product of the New Zealand forest.

"In the discussion," writes Sir Walter in his paper, "which followed the reading of Mr. Maskell's paper on November 4th, I maintained, in opposition to that gentleman's definition—'animal at one end, vegetable at the other,'—that the so-called vegetable caterpillar, as we now find it, is entirely vegetable substance. The author, as I understood him, contended that the body of the caterpillar had become permeated with vegetable tissue, but that the outer integument or skin was still dried animal matter. To put an end to any possible doubt on the subject, I forwarded to Sir James Hector a specimen of the vegetable caterpillar, and asked him to get it examined and tested by the Government analyst, for the purpose of ascertaining its true constituents. The following result has been officially communicated to me:—

"'Mr. Skey.—The question at issue is, whether the skin of the caterpillar remains, or if it has been converted into fungus like the soft internal tissues. The presence or absence of chitine will determine the question. Save the specimen for reference.—James Hector; Nov. 22nd, 1894.'

"'Vegetable Caterpillar.—*For animal matter in the so-called skin.* The skin does not give any indication of chitine or other animal substance. It burns without intumescence, and does not evolve the odour of nitrogenous matter in combustion.—William Skey; Nov. 23rd, 1894.'

"In the course of my remarks at the meeting, I stated that I had dug up in the woods hundreds of this singular product, and that in every instance that had come under my observation the caterpillar, in the living state, had descended into the ground tail-foremost, the stem of the fungus afterwards springing from a point between the back of the head and the first fold of the neck, and then ascending vertically to reach the light. Since that date I have been examining the specimens in my collection, and I have found one very curious example in which there is evidence of a different proceeding on the part of the caterpillar, with exactly similar growth of the fungus. In this instance the caterpillar had evidently buried itself head-foremost, and then turned its head slightly to the left, whereupon the fungus had commenced its stem-growth at the usual point, and travelled upwards in a line with the body, curving and twisting somewhat before emerging at the surface of the ground.

"In most specimens the stem is more or less twisted, and sometimes bifurcate before it reaches the surface, after which it assumes a perfectly erect character, the fructification being at the top, 3 or 4 in. of the terminal part being covered with closely-set spores, having externally a granulate appearance. The longest stems I have met with ordinarily measure 7 or 8 in. from the insertion to the extreme tip.

"I trust I have made myself sufficiently clear, but the peculiarity I have been describing is better seen on the accompanying plate (reduced from a photograph), in which fig. 1 represents this abnormal form. Figs. 2 and 3 on the same plate exhibit the vegetable caterpillar as it is ordinarily met with (upper and lower aspect), the smaller of the two showing the branched process I have mentioned, about an inch from its head. Fig. 4 illustrates the curved manner in which the caterpillar sometimes disposes its body before undergoing its final transmutation into fungus. The body of the specimen represented by fig. 1 measures 75 mm., and its stem, measured in a straight line, 150 mm. Although the caterpillars are of about equal size, the stem of No. 1, owing to its eccentric manner of growth, is 2–5 in. longer than that of No. 2. (The body of the largest caterpillar measures exactly 3 in. in length.)

"The popular notion that the vegetable caterpillar is found only under rata- and kauri-trees is quite an erroneous one. It is abundant in the southern parts of the North Island, where the kauri does not exist, and I have found it in localities from which the rata is absent,—for example, in small clumps of bush in the Taupo country. Indeed, it may be looked for in all suitable places, although, as a rule, it is more numerous near the summits of the wooded ranges, the fungus shooting up its little stem, like a miniature bulrush, among the dead leaves and decaying vegetation which cover the ground in such situations, often to the depth of several inches. After scraping away this surface-covering, it is necessary to dig out the vegetable caterpillar very carefully with a sheath-knife, the slightest attempt at forcing it up breaking the stem and destroying the specimen. Sometimes several are found grouped together within a foot of each other; but it requires a practised eye to distinguish the tiny stem among its surroundings of a similar hue. It is often rooted up and eaten by the wild pigs, and in the Taupo country I found the wood-hen digging up and devouring it. When fresh it has a pleasant nut-like flavour."

In this abstract I give Sir Walter's description of the plate accompanying his paper. The measurements and remarks on the plate should, I think, prove of interest in the absence of specimens. W. W. Smith.

Ashburton, New Zealand, March, 1895.

A FEW NOTES ON THE BUTTERFLIES OF BARBADOS.

By Sidney Crompton, F.E.S.

The existing published information about the Lepidoptera-Rhopalocera of Barbados (the most eastern of the Caribbee Islands) is not only scant and meagre, but also difficult of access. The chief or oldest authority on the natural history of the island is Mr. Griffeth Hughes, A.M., whose book on the subject was published in 1750. Copies of this book are exceedingly scarce. As might be surmised of a treatise published so long ago, it is not conspicuous for great scientific accuracy or lucidity of exposition. The full title of this rare volume is 'The Natural History of Barbados. In ten books. By the Reverend Mr. Griffeth Hughes, A.M., Rector of St. Lucy's Parish in the said island, and F.R.S. London. Printed for the Author; and sold by most book-sellers in Great Britain and Ireland. MDCCL.'

Our other source of information is 'The History of Barbados,' by Sir Robert H. Schomburgk, Ph.D., in one volume. In this book (published in 1848) there are two chapters devoted to natural history, one treating of organic nature as developed in Barbados, and one of animated nature. The first treats of the botany and marine sponges of the island, and the second chapter is given to a more or less popular account of the Radiata, Insecta, Arachnida, Crustacea, Mollusca, Fishes, Reptiles, Birds, and Mammalia.

Besides these two books, the one by Hughes and the one by Schomburgk, both now out of date and out of print, there is, of course, Charles Kingsley's well-known and delightful narrative, 'At Last.' This aims at being little more than a narrative of the author's impressions of the West Indian Islands, but incidentally there is much in the book treating of natural history, including some observations on the butterflies of Trinidad and other of the Windward Islands, but very little is said about Barbados.

Barbados is remarkably poor in its lepidopterous fauna. This poverty is no doubt caused by the absence of forest and uncultivated underwood in the island. Every part is cultivated for the sugar-cane, with the exception of that district known as St. Andrew's Parish, the central part on the eastern side, which contains the highest elevation, the largest stream, and a gas-jet called "the boiling spring." But, speaking generally, the island of Barbados may be described to-day in the words of John Reid, who, speaking of the island in a letter dated Aug. 5th, 1665, says it is one great garden, no less pleasant than fruitful, but now wholly given to sugar-cane. Every available acre is and always has been under cultivation, and to this must no doubt be ascribed its extreme poverty of lepidopterous insects.

Schomburgk states that occasionally one or other species of larvæ shows itself in prodigious numbers, but (fortunately for the vegetation) this does not occur frequently. It is recorded that in 1846, at Colleton, in Barbados, a field of sweet potatoes (*Batata edulis*), consisting of about ten acres, was deprived of its leaves in one night by the larvæ of a *Chœrocampa*, a sphingid moth. Of the nocturnal Lepidoptera of the Antilles, few have been described, and not one of these, says Sir Richard Schomburgk, is known to be in Barbados. I myself collected from the frangipanni-trees many larvæ of *Chœrocampa nechus*.

The following is Schomburgk's list of Antillean Heterocera*:—

Macroglossa tantalus, H.-S., Corr. Bl. p. 56.
Callionime parce, Fabr.
Philempelus labruscæ, Linn.
Chœrocampa nechus, Fabr.; *C. thorates*, Hübn.
Anceryx ello, Linn.; *A. obscura*, Fabr.
Amphonyx duponchelii, Boisd.
Urania sloaneus, Cramer.
Empyrema pugione, Cramer.
Euchromia parthenis, Fabr.
Decopeia ornatrix, Cramer.

Schomburgk only mentions two butterflies, *i. e.*, *Papilio polydamas* and *Callidryas marcellina*. The former of these two is found in Brazil, Honduras, and Jamaica; the latter is common to Venezuela, Guiana, Brazil, and Bolivia.

I myself have caught at Hastings (in Barbados), in November, numbers of *Danais archippus*, and one hereomorphic form of the same. There is a field (locally called "savannah"), near the Marine Hotel, Barbados, where the food-plant of *D. archippus* (*Asclepias curasavica*) grows in abundance; and here, in

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* I hope to say something in a future paper about the synonymy of the Lepidoptera as given in Sir R. Schomburgk's list printed above.—S. C.

November, I captured numbers of imagines of the above-named *Danais;* they differed in no way from the typical *D. archippus.*

As Hughes's book on the 'Natural History of Barbados' is so rare, I give here his quaint and quite untechnical descriptions of Barbadian butterflies:—

"The Black-spotted Butterfly.—This is about three-quarters of an inch long. The back is covered with soft greenish down. The abdomen is divided into several annuli, or sections, tho' scarce perceivable. The antennæ are about half an inch long, and its legs six in number. It hath four very thin membranaceous wings, covered with very fine yellow mealiness. This mealy dust, when viewed through a microscope, appears to be so many quills, feathered with the utmost exactness and proportion. The body of this, as well as the following ones, is decked with a profusion of beauty, and all, in the words of the great Milton—

> . . . . 'wave their limber fans
> For wings, and smallest lineaments, exact
> In all the liv'ries deck'd of summer's pride,
> With spots of gold and purple, azure, and green.'

Should any one impertinently ask, 'What use these things are of in the creation?' he may be answered in the words of the ingenious Mr. Ray, that they are designed 'ad ornatum universi, et ut hominibus spectaculo sint; ad rura illustranda, velut tot bracteæ, infervientes. Quis enim eximiam earum pulchritudinem, et varietatem contemplans mira voluptate non afficiatur? Quis tot colorum et schematum elegantias naturæ ipsius ingenio excogitatas et artificiis penicillo depictas, curiosis oculis intuens, divinæ artis vestigia eis impressa non agnoscat et miretur?'

"The White Butterfly.—This exactly resembles the last described in every particular except its colour. These are chiefly to be seen flying about ponds of stagnated waters in the most beaten roads.

"The Dark-red Black-spotted Butterfly.—This is about an inch long from the head to the tail. Its antennæ are three-quarters of an inch long, and its two eyes black, round, and shining. The wings are of a dirty red, irregularly impanelled with black lists; and the margin or border of each wing much darker than the rest; and here and there adorned with many white spots, as well as the head, back, and breast. The abdomen is of a dark ferrugineous colour, and composed of seven annuli."

Are not these perfectly delightful diagnoses of Lepidoptera? There is something quite refreshing to the jaded student of scientific descriptions, whose tongue wearies of such phrases as "caputal squammation," "disco-cellular nervule," "serobiculate," and the like, in Mr. Hughes's comprehensive summary of a butterfly as having "pale red and whitish spots intermixed with the black." Now-a-days entomologists do not quote Milton and "the ingenious Mr. Ray," nor would a modern evolutionist call the ornamentation on a butterfly's wing "divinæ artis vestigia."

In conclusion, I earnestly advise all collectors going to the West Indies on an entomological expedition to go well provided with store-boxes, killing-bottles, pins, setting-boards, &c., &c., as such things cannot be bought in the islands, and great delay is caused by having to order them from England.

Salamanca, Santa Cruz, Teneriffe.

NOTES ON *ONTHOPHAGUS*, LATR.; WITH CORRECTIONS OF NOMENCLATURE, AND A DESCRIPTION OF A NEW GENUS.

By John W. Shipp.

PHALOPS, *Erichs.*, Wiegm. Archiv. 1848, p. 103.

= EPHILLOPUS, *Reitter*, Verh. des Naturf. Vereines in Brun. xxxi. p. 168, 47.

Type: *ciconia*, Fabr., Syst. El. i. p. 51; = *barbicornis*, Koll. MS.; = *corruscus*, Dej., Cat. 3rd ed. p. 156; = *iphis* var., Erichs., Naturf. Ins. iii. p. 764, note 4; = *iphis*, Oliv.

The genus *Phalops* was founded by Erichson for the reception of *Onthophagus ciconia*, Fb., in 1848.

Reitter in 1892 proposed the name *Ephillopus* for the group, taking for his type *iphis*, Ol.; but as *iphis*, Ol., is synonymous and congeneric with *ciconia*, Fb., Reitter's name *Ephillopus* will have to fall.

Erichson's subgenus *Monapus* (Wiegm. Arch. 1848) will have to be rejected, as he did not give any definite characters by which to identify it.

Chalcoderus, Er., is to be taken as the subgenus formed by *rudis*, Sharp, *maculatus*, Fb. = *signatipennis*, Dej., *ater*, Waterh., and allied forms.

Psilax, Erichs. (*l. c.*, p. 103), has for its type *pronus*, Fb.

Gonocyphus, Lansb. (Ann. Mus. Civ. di Genova, 1885, p. 382), contains the following species: (*Onth.*) *obliquus*, Fb., *angulatus*, Redt., *lenzi*, Har., *æsopus*, Lansb., *gibbicollis*, Lansb., and allied forms.

I append a list of species, with their synonymy and alterations of nomenclature:—

ONTHOPHAGUS, *Latr.*

1. *gorhami*, Shipp,
   = *granulifer*, Reitter, V. N. Vereines, Brun. xxxi. 1892, p. 83.
   Hab. Algeria.
2. *granulifer*, Har., B. E. Z. xxx. 1886, p. 142.
   Hab. Orange Free State (South Africa).

3. *humator*, Shipp,
   = *humeralis*, McLeay, P. L. S., N. S. W. (2) iii. p. 903, 1888.
   Hab. King's Sound (Australia).
4. *humeralis*, Raffr., Revu. Zool. 1877 (3) v. p. 322.
   Hab. Abyssinia.
5. *hector*, Shipp,
   = *haroldi*, Per., T. S. Afr. Phil. Soc. iv. 1888, p. 97, pl. i. figs. 5–8.
   Hab. South Africa.
6. *haroldi*, Baillon, Bull. Mosc. 1870, p. 332.
   Reitter, Ver. Nat. Vereines. Brun. xxxi. 1893, p. 80.
   Hab. Turkestan.
7. *variegatus*, Fabr., Ent. Syst. Suppl. p. 36.
   Hab. Ind. Or.
8. *filicornis*, Har., Col. hefte xi. p. 107,
   = *variegatus*, Roth. (*nec* Fb.). Wiegm. Archiv. 1851, i. p. 125.
   Hab. Tigre.
9. *truncaticornis*, Schall., Abhandl. Halle. Ges. 1783, p. 238.
   Hab. Malabar.
10. *trucidatus*, Har.,
   = *truncaticornis*, Boh. (*nec* Schall.), Ofvers. Vet. Ak. Forh. 1860, p. 113.
   Hab. N'Gamè, South Africa.
11. *Truncaticornis*, Herbst., is a synonym of *œneus*, Fabr.,
   = *spinifex*, ♀, Fabr.
12. *nitidior*, Bates, Bio. Cent. A. Col. ii. (2), 1887, p. 67, pl. v. f. 1, 1 *a*.
   Hab. Mexico.
13. *blackburni*, Shipp,
   = *nitidior*, Blackburn, Tr. R. S. S. Austr. xv. p. 209, 1892.
   Hab. New S. Wales.

I venture to take this opportunity of describing a new genus as follows :—

TAURONTHOPHAGUS, *mihi*.

This genus is distinguished by having the head furnished with two very long branching horns, extending from the centre of the head over and beyond the posterior margin of the thorax, and with a small rounded dilation towards the extreme apex, and a small tooth pointing inwards near the base. The humeral prominences are produced into a distinct dilated strong tooth, the apex slightly leaning towards the suture. The posterior margin of the thorax is very strongly emarginated, the centre being produced into a slight scutellary projection, which overlaps the scutellary space. Abdomen is compressed towards apex, and rather convex. Pygidium thickly covered with hairs.

Type of the genus, *O. rangifer*, Klug, Monatsb. Berl. Ak. 1855, p. 652; Peter's Reis. 1862, p. 228, t. 13, f. 12.
Hab. Sena, Natal.

Oxford, 1895.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 158.)

Caradrina quadripunctata, *Fb.*—Everywhere very numerous. The varieties *cubicularis*, Haw., and *superstes*, St., occur not uncommonly; the former being the pale grey form with distinct markings, and the latter a dark one very slightly marked.

Rusina tenebrosa, *Hb.*—Generally distributed, but local and rarely abundant. The following few localities do not at all represent the distribution, as collectors frequently neglect to record its occurrence. The var. *obscura*, Tutt, is more common than the type at Killarney and elsewhere. Belfast (*W.*); Castle Bellingham, Co. Louth, abundant (*Thornhill*); coast of Waterford, Dunmore and Tramore; Killarney; Ballynahinch, Connemara; shores of L. Gill; and Markree, Co. Sligo.

Agrotis vestigialis, *Hufn.*—Very generally distributed round the Irish coast, in some localities rather rare. The type with whitish ground colour is scarce. I have taken it at Donegal, Arklow, and Youghal. The aberration with the cuneiform dashes extending to the outer margin sometimes occurs; ab. *lineolata* Tutt: var. *sagittiferus*, Haw., is, I think, the most abundant form, and occurs at Sligo, Donegal, on the shores of L. Foyle, and on the sandhills of the Wexford and Wicklow coasts, &c.; and with it I have taken a few with obsolete markings, ab. *trigonalis*, Esp. A not unusual form is that with a warm ochreous ground colour, var. *clavis*, Esp., which Mr. Tutt notes as so common near Sligo. I have also found it at Ballinskelligs Bay, Co. Kerry; Youghal, Co. Cork; and Magilligan, Co. Derry. A very dark fuscous form, var. *nigra*, Tutt, is frequently to be met with in company with the pallid type, at Arklow, Co. Wicklow; and I have specimens of it from Wexford and Sligo. I append a few other general localities for this species. Howth and Co. Dublin coast generally, rather scarce. Pretty common on the sandhills of Loughs Foyle and Swilly; Sheephaven and Inver, a few, Co. Donegal; Portrush and Antrim coast, abundant (*C.*); at Greenore (*J.*), and Castle Bellingham, Co. Louth (*Thornhill*).

Agrotis puta, *Hb.*—Colonel Partridge reports the capture of one specimen near Enniskillen in 1893.

Agrotis ypsilon, *Rott.* (*suffusa, Hb.*)—Common and often pretty abundant. The markings vary in intensity in both sexes, the males sometimes having a very pale ground colour with very distinct design; but often the costal half of the fore wings is darkly shaded with brown, with the markings not sharply pencilled. The females sometimes are of a very black ground colour. Mr. Tutt's specimen from the Isle of Lewis, named *pallida*, corresponds to a male and female I have from Kenmare and Enniscoe, Co. Mayo, with very whitish outer marginal area; the female having the rest of the wing very black.

(To be continued.)

NOTES AND OBSERVATIONS.

Sericoris ingratana, sp. nov.—I have a very fine specimen of a Tortrix which I bred from balsam about five years ago. It has been examined by Messrs. Barrett, Webb, and others, but remained undetermined until I sent it to Lord Walsingham, who returned it with the remark that it was a *Sericoris* allied to *S. palustrana*. I now therefore propose to name it *S. ingratana*. It is a dull-looking insect, like the dark form of *S. latifasciana*. There is a broadish regular band across the centre of the fore wing, and a narrower band between it and the outer margin; beyond the second band is a small white spot. Cilia grey, with a faint dull spot near the inner margin. From *S. palustrana* this species differs in colour of ground and cilia, and in the absence of silvery marking. — J. B. Hodgkinson; Rosebery House, Ashton-on-Ribble.

Colour-changes in Plusia chrysitis.—With regard to Mr. W. D. Thornhill's remark as to *P. chrysitis* (*ante*, p. 159), and the two shades of bronze, *viz.*, the golden and the green-bronze, the suggestion that it is due to age of the specimen is, in my opinion also, the correct one. In 1892 I noticed the point of difference, and made a few experiments to see if the theory was correct, and so far as I went it was. The few specimens that I bred were of the golden tinge, whilst aged specimens taken with the net always showed the green hue. In the forthcoming summer it would be interesting to rear some specimens, note the shade, and then keep them alive as long as possible to see if any appreciable change in tint occurs.—W. J. Kaye; Worcester Court, Worcester Park, Surrey, May 2nd, 1895.

Hybernia defoliaria in March.—Mr. South (*ante*, p. 89) points out that this species has been met with as late as March 4th. It may therefore be of interest to state that I took a female example at Addington on March 13th last.—T. B. Fletcher; April 19th, 1895.

Nyssia pomonaria. — This species is figured in Eleazar Albin's 'Natural History of English Insects,' published in 1749. Description of Plate 97:—The caterpillar (*a*) was a kind of looper; it was hairy (which is not very common amongst them), and beautifully marked with several colours. It was found on the hazel the first of June, and on the 14th of the same month it went into the ground and changed into a chrysalis (*b*); and at the beginning of April came the moth (*c*, *d*). —C. W. Dale.

CAPTURES AND FIELD REPORTS.

Vanessa polychloros in Surrey.—Seeing that Mr. Grover, of Guildford, states in his article (*ante*, p. 150) that *Vanessa polychloros* is rare in the immediate vicinity of Guildford, it may be of interest to know that here in Cranleigh (situated about eight miles to the east of Guildford) the above insect is far from being rare, it being especially abundant in 1894; the chrysalids were quite common objects, hanging under eaves, porches, &c., anywhere in the neighbourhood of limes or elms, although I believe many fell a prey to ichneumons.—Harold E. Winser; Kent House, Cranleigh, April 27th, 1895.

Notes from Reading.—The season has opened well here for the entomologist, though about ten days later than last year. Such Lepidoptera as *Hybernia rupicapraria*, *H. leucophæaria*, *H. progemmaria*, and *Anisopteryx æscularia* have been plentiful on lamps, pales, and tree-trunks. *Cymatophora flavicornis*, abundant on the young birch-stems. *Amphidasys prodromaria*, not very plentiful this year. *Nyssia hispidaria*, scarce; I only took five males, this being the third year of its capture in this district. *Larentia multistrigata* and *Pachycnemia hippocastanaria*, fairly plentiful. *Brephos parthenias*, in abundance, flying over the tops of birch-trees. *Lobophora lobulata*, beaten from birch in fair numbers. April 10th, I searched for *Endromis versicolor;* saw only one male flying, but was fortunate enough to capture three females on the birch-twigs, one of which laid a large batch of fertile ova, from which I am rearing a fine colony of larvæ, now in their third coat. Sallows did not pay about here, but sugar did; I took *Tæniocampa gothica*, *T. cruda*. *T. stabilis*, *T. instabilis*, and *T. munda; T. cruda* literally swarming one or two nights. I worked well for a fortnight, sugaring for *Dasycampa rubiginea*, but failed to take it this spring, although I have taken it here for the last five years: one at sugar, autumn, 1891; three, autumn, 1892; nineteen, autumn, 1893; one last spring. I captured two females at sugar, from which I reared considerably over 200 imagines. I have also taken *Notodonta chaonia*, *Stauropus fagi*, and *Psyche opacella* larvæ. *Leucophasia sinapis* is very plentiful again this year in its usual haunts.—W. Barnes; 7, New Road, Southern Hill, Reading, May 13th.

Orgyia gonostigma.—On May 14th I was out with a friend, looking for larvæ, when I was greatly surprised to find a beautiful larva of *Orgyia gonostigma*, sunning itself on a leaf of the common meadow-sweet. Further search revealed seven more, two of which were feeding on meadow-sweet and five on dwarf willows. This insect must be a somewhat general feeder, as I am now feeding the larvæ on elm; and last summer we found one about a mile from the same place feeding on wild apple-leaves.—H. W. Shepheard-Walwyn; Hertford College, Oxford.

Note on Asphalia flavicornis.—Mr. Arkle, in speaking of *A. flavicornis* (*ante*, 163), says: "Yet the moth is seldom found in spring." We certainly take it here plentifully enough during the first or second week in March, by searching the low birches or underwood. I know of no moth more easy to find in such situations, but on the old birches it is certainly difficult to see; we also take it at sugar. Perhaps Mr. Arkle's remark applies only to the district in which he usually works; yet I cannot help thinking if it was worked for systematically it would be found in some abundance even there.—A. H. Hamm; Reading, May 2nd, 1895.

Spilosoma lubricipeda var. fasciata, *Tugwell.*—On May 6th, 1893, I captured here, on a gas-lamp, a specimen of this variety. It agrees exactly with the figure in Entom. xxvii. 207, except that the transverse fascia on the secondaries is lacking. Mr. E. F. Studd, to whom I showed the specimen, says that it is identical with specimens of this variety which he had received from Mr. Tugwell. This capture seems to me worthy of record, since, so far as I know, all previous specimens of this variety have been taken in Lincolnshire and the adjacent counties, and not in the south of England.—T. B. Fletcher; 78, Thornlaw Road, West Norwood, S.E.

Aëpophilus bonnairii.—While hunting on the shore, about half tide, at Mount Batten, in front of the coast-guard station, on the 28th instant, Mr. J. H. Keys and myself were rewarded by the capture of a mature specimen of *Aëpophilus bonnairii*, and twenty *Aëpus*, the majority of which were *A. robinii.* I may add that subsequently Mr. Keys took several *Aëpophilus bonnairii* in the same locality, some mature, the majority immature.—G. C. Bignell; Stonehouse, April 29th, 1895.

SOCIETIES.

Entomological Society of London.—*March* 20*th*, 1895.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. Claude Morley, of London Road, Ipswich; Mr. Herbert E. Page, of 14, Nettleton Road, New Cross, S.E.; Mr. W. W. Smith, of Ashburton, Canterbury, New Zealand; and Mr. Henry Tunaley, of 30, Fairmont Road, Brixton Hill, S.W., were elected Fellows of the Society. Mr. H. St. John Donisthorpe exhibited a living female of *Dytiscus marginalis* with elytra resembling those of the male insect. Dr. Sharp said he had seen this form before, but that it was very rare in this country, though abundant in some parts of the palæarctic region. Professor Stewart asked if the genitalia had been examined. Mr. Champion stated that Mr. J. J. Walker had collected several females of an allied species (*D. circumflexus*) at Gibraltar with elytra resembling those of the male. Dr. Sharp exhibited specimens of *Brenthus anchorago*, from Mexico, showing extreme variation in size. He remarked that the males varied from 10½ mill. in length to 51 mill.; the female from 9½ mill. to 27 mill. In the male the width varied from 1½ mill. to 4 mill. The length therefore varied from about 5 to 1, and the width from 3 to 1 in the male. Mr. Blandford commented on the difficulty of mounting minute Lepidoptera, Diptera, Neuroptera, &c., and exhibited samples of strips of material which he had found most suitable for the purpose of staging minute insects. He said his attention had been called to this method of mounting by the receipt of specimens from Dr. Frič, of Prague. On examination of the material he had found it to be a fungus, *Polyporus betulinus.* He stated that Lord Walsingham had expressed his satisfaction with this material, and had sent him specimens, similarly mounted, from Zeller's collection. Mr. McLachlan remarked that he thought the material exhibited preferable to artichoke pith, which had been used for a similar purpose. Mr. Goss exhibited a species of a Mantid, *Pseudocreobotra wahlbergi*, Stål, received from Captain Montgomery, J.P., of Mid-Ilovu, Natal. He said he was indebted to Mr. Champion for determining the species. Mr. Frederick A. A. Skuse communicated a paper entitled "On a Colour Variety of *Heteronympha merope*, Fab., from New South Wales," and sent coloured drawings of the typical form and the variety for exhibition. Mr. Oswald H. Latter read a paper entitled "Further Notes on the Secretion of Potassium Hydroxide by *Dicranura vinula* (imago) and similar Phenomena in other Lepidoptera." The paper was illustrated by the oxy-hydrogen lantern. Professor Meldola congratulated Mr. Latter on the thorough way in which he had worked out his experiments, and said that in view of the small quantity of material at his disposal, the concordance in the results was remarkable. He added that Mr. Latter had, for the first time, proved the secretion of free potassium hydroxide in the animal kingdom. Mr. Blandford, Mr. Merrifield, Mr. Latter, and Mr. Dixey continued the discussion. Mr. Merrifield read a paper entitled "The Results of Experiments made last season on *Vanessa c-album* and *Limenitis sibylla*." This was illustrated by an exhibition of specimens of *L. sibylla*, and a long series of *V. c-album*, to show the effects of temperature in producing variation. Dr. Dixey said that many of the forms of *V. c-album* exhibited reminded him of *V. c-aureum*, a Chinese species, which he believed to be the oldest form of the genus. He thought that much of the variation shown in this series of specimens was due to atavism, and was not altogether attributable to the effect of temperature. Mr. Barrett said he was interested to find that one of the forced forms of *L. sibylla* was similar to a specimen he had seen which had emerged from the pupa during a thunderstorm. In connection with Mr. Merrifield's paper Mr. F. W. Frohawk exhibited a series of 200 specimens of *V. c-album* bred from one female taken in Herefordshire, in April, 1894. The series consisted of 105 males and 95 females, and included 41 specimens of the light form and 159 of the dark form. Professor Meldola, in proposing a vote of thanks to Mr. Merrifield, Dr. Dixey, and Mr. Frohawk, said that he was glad to think that the subject of seasonal dimorphism, which had been first investigated systematically by Weismann, was receiving so much attention in this country. He was of opinion that the results hitherto arrived at were quite in harmony with Weismann's theory of reversion to the glacial form, and all the evidence recently accumulated by the excellent observations of Mr. Merrifield and others went to confirm this view as opposed to that of the direct action of temperature as a modifying influence. Mr. Merrifield, Mr. Barrett, and Dr. Dixey took part in the discussion which ensued.—H. Goss, *Hon. Sec.*

April 3rd.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. C. J. Gahan exhibited two examples, male and female, of a rare Prioned beetle, *Chariea cyanea*, Serville, which had been kindly sent to him for examination by Mons. René Oberthür; and stated that Lacordaire was mistaken with regard to the sex of the specimen which he described in the 'Genera des Coléoptères.' He pointed out that the elytra of the male were relatively much shorter than those of the female, and that the joints of the antennæ from the third to the tenth were biramose. Mr. Gahan also exhibited two species of the genus *Decarthria*, Hope, and said he believed these were the two smallest species of Longicorns known. Dr. Sharp exhibited the soldiers and workers of a species of Termites found by Dr. Haviland in South Africa. He stated that these insects possessed eyes and worked in daylight like hymenopterous ants, and that in habits they resembled harvesting ants by cutting grass and carrying it into holes in the ground. Dr. Sharp said that although these holes were probably the entrance to the nests, Dr. Haviland was unable to find the actual nest, even by prolonged digging; so that the winged forms were still unknown. He thought this species was probably allied to *Termes viarum* of Smeathman, in which the soldiers and workers possessed eyes, and had been observed by Smeathman to issue from holes in the ground, and whose nest could not be discovered. Mr. McLachlan observed that it was possible there might be species of Termites without any winged form whatever. Mr. Rye called attention to the action of one of the Conservators of Wimbledon Common, who, he stated, had been destroying all the aspens on the Common. He enquired whether it was possible for the Entomological Society to protest against the destruction of the trees. Mr. Goss said he would mention the matter to the Commons Preservation Society. Mr. Francis Galton read a paper entitled "Entomological Queries bearing on the question of Specific Stability." The author said that the information desired referred to:—(1) Instances of such strongly marked peculiarities, whether in form, in colour, or in habit, as had occasionally appeared in a single individual in a brood; but no record was wanted of monstrosities, or of such other characteristics as were clearly inconsistent with health and vigour. (2) Instances in which any one of the above peculiarities had appeared in the broods of different parents. In replying to this question, he said it would be hardly worth while to record the sudden appearance of either albinism or melanism, as both were well known to be of frequent occurrence. (3) Instances in which any of these peculiarly characterized individuals had transmitted their peculiarities, hereditarily, to one or more generations. Mr. Merrifield stated that he received some years ago, from Sheffield, ova of *Selenia illustraria*, the brood from which produced, in addition to typical specimens, four of a dark bronze colour, and from these he bred a number of specimens of a similar colour. Dr. F. A. Dixey referred to a variety of the larva of *Saturnia carpini* with pink tubercles. He said the imago bred from this larva produced larvæ of which ten per cent. had pink tubercles. Professor Poulton said he had found larvæ of *Smerinthus ocellatus* with red spots, and that this peculiarity had been perpetuated in their descendants. Mr. McLachlan, Canon Fowler, and Professor Meldola made some further remarks on the subject. Mr. G. F. Hampson read a paper by Mr. C. W. Barker entitled "Notes on Seasonal Dimorphism in certain Species of Rhopalocera in Natal." Mr. Merrifield said he was of opinion that a record of the temperature at different seasons would be a very desirable addition to observations of seasonal dimorphism. Mr. Hampson said he believed that temperature had very little to do with the alteration of forms. At any rate, according to his experience, in India the wet-season form succeeded the dry-season form without any apparent difference in the temperature. Professor Poulton remarked that the apparent temperature as felt must not be relied upon without observations taken by the thermometer. Dr. Dixey, Mr. Barrett, Dr. Sharp, and Professor Meldola continued the discussion.—H. Goss & W. W. Fowler, *Hon. Secretaries.*

May 1*st*.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. Oswald H. Latter, M.A., of the Charterhouse, Godalming, was elected a Fellow; and Dr. C. G. Thomson, of the University, Lund, Sweden, was elected an Honorary Fellow, to fill the vacancy caused by the death of Pastor Wallengren. Mr. Horace St. J. Donisthorpe exhibited a variety of *Rhagium bifasciatum*, a longicorn beetle, taken in the New Forest, in which the elytra were of a light testaceous colour. Mr. Waterhouse exhibited a living larva of a longicorn beetle found in a boot-tree which had been in constant use by the owner for fourteen years, the last seven of which were spent in India. The specimen was brought to the British Museum on May 6th, 1890, and was put into a block of beech wood in which it had lived ever since; it did not appear to have altered in any way during these five years. It had burrowed about eight inches, and probably made its exit accidentally. Mr. Blandford referred to a similar case which had come under his notice. Mr. C. G. Barrett exhibited a long series of the dark and strongly-marked varieties of *Agrotis cursoria* and *A. tritici*, taken on the sandhills of the north-east coast of Scotland by Mr. Arthur Horne, of Aberdeen. Mr. Dale exhibited a specimen of a *Sesia*—supposed to be a new species—from the New Forest. Mr. O. E. Janson exhibited a remarkable species of *Curculionidæ* from the island of Gilolo, having exceedingly long and slender antennæ and legs; it was apparently an undescribed species of the genus *Talanthia*, Pascoe. Mr. Nelson Richardson called attention to a paper by himself, in the 'Proceedings of the Dorset Natural History and Antiquarian Field Club,' on the subject of Dorset Lepidoptera in 1892 and 1893. Mr. W. L. Distant communicated a paper "On a probable explanation of an unverified observation relative to the family Fulgoridæ." In this paper the author cited the expressed opinions of certain naturalists as to the luminous properties of some species of this family. In the discussion which ensued Mr. Blandford said he thought further evidence was required on the subject of the alleged luminosity in the Fulgoridæ before the statements contained in Mr. Distant's paper could be accepted. Mr. J. J. Walker, R.N., contributed a paper entitled "A Preliminary List of the Butterflies of Hong-Kong, based on Observations and Captures made during the winter and spring months of 1892 and 1893." Professor Meldola commented on the interesting character of the paper from an entomological point of view, and the value of the observations therein on the geology, botany, and climate of Hong-Kong.—H. Goss, *Hon. Secretary.*

South London Entomological and Natural History Society.—*March* 28*th*, 1895.—T. W. Hall, F.E.S., President, in the chair. Mr. Ashby, Maida Vale, N.W., and Mr. H. Woods, Ashford, Kent, were elected members. Among the donations to the Society was a handsome lantern and screen, presented by Mr. Stanley Edwards. Mr. Fenn exhibited long series of *Selenia illunaria*, Hb., including a third brood. Mr. J. T. Carrington gave an interesting address entitled "Some Collecting Grounds and the Trees there," illustrating his remarks by a large number of lantern slides, admirably executed and kindly lent by Mr. Fred. H. Evans.

April 11*th*.—C. G. Barrett, F.E.S., Vice-President, in the chair. Mr. Winkley, on behalf of Mr. Montgomery, of Ealing, exhibited and read notes on a bred series of *Nyssia hispidaria*, Hb. One specimen was whitish, without the central band, and having only the transverse lines and apical streak dark grey; another example was uniformly smoky black. Mr. Edwards, male and female *Dynastor napoleon*, and a specimen of *Papilio martia*, from Brazil. A discussion took place as to the season, and the general opinion was that the present spring was some three weeks later than last year.

April 25*th*.—T. W. Hall, F.E.S., President, in the chair. Mr. Ashdown, of Leatherhead, was elected a member. Mr. Frohawk exhibited a variety of *Papilio machaon*, L., having ochreous yellow blotches at the anal angle, and the blue markings almost white. It was bred from Wicken larvæ. Mr. Mansbridge, three melanic specimens of *Phigalia pedaria*, Fb., taken by him this year near Barnsley, and remarked on the gradual extension of this variation. Mr. Adkin said that Mr. South had taken a black example of the female at Macclesfield. Mr. Moore, a specimen of *Pterostichus madidus*, F., which had been attacked by a *Gordius*. Mr. Turner, a specimen of *Plusia moneta*, Fab., which was taken at West Wickham in July, 1894, by Mr. Slade, of Gellatly Road, Hatcham; also a series of *Spilosoma menthastri*, Esp., two specimens having only a few small dots on the fore wings; three Scotch forms with a darker ground, and having the second line more or less complete, especially in one specimen.

May 9*th*.—The President in the chair. Mr. Williams exhibited a curious cluster of cocoons fastened on a twig in a caterpillar-like group. Mr. T. W. Hall, a variety of *Smerinthus ocellatus*, L., in which the ocelli were considerably obscured. Mr. Enock, specimens of the exceedingly rare fly *Polynema nutans*, Lub., one of the Mymaridæ, which inhabits water, and lays its eggs in those of the dragonfly. In describing it he said that it used its wings for swimming, and although observed first in 1862 by Sir John Lubbock, had only been seen once since. He himself had, until the present week, vainly looked for it. Mr. Mansbridge then read an interesting paper on "Prairie Insects," giving an account of the insect inhabitants of prairies in the Indian territory other than Lepidoptera. In the discussion which ensued Messrs. Pearce, Carrington, and Warne gave their experiences in similar regions.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*March* 18*th*, 1895.—Mr. P. W. Abbott, Vice-President, in the chair. Mr. C. J. Wainwright showed two specimens of a *Zygæna* from the New Forest, one of which was sent to him as *meliloti*, but which he thought was unsatisfactorily named; Mr. Abbott believed them both to be *trifolii*. Mr. R. C. Bradley showed a spider from Sutton which was much like *Formica rufa* in general appearance. Mr. P. W. Abbott, a nice series of *Hesperia actæon* from Lulworth. Mr. R. C. Bradley, a box from his collection containing, amongst others, the Psychidæ; and he gave a short description of the species, and remarked that they offered a good field for further work; one *Solenobia* he possessed Mr. Barrett believed to be new, and wished to see more specimens; it was taken in Wyre Forest. —Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

L'Amateur de Papillons. By H. Coupin. Paris: J. B. Baillière et Fils. Dec., 1894.

This profusely illustrated guide for the beginner in entomology comes opportunely at the opening of the season. Curiously enough, nearly all the species figured are found in Britain as well as on the Continent, and although the cuts leave much to be desired in the direction of clearness, they should be of considerable use to the isolated collector in naming his captures. We find chapters on Physiology, Protective Resemblance, Polymorphism, &c.; but it is in the sections devoted to the various methods of collecting that the author is strongest. Its chief merit lies in bringing under one cover a large amount of detailed information which is of great value to the young student, and we wish that some such complete handbook to collecting existed in English.

There are some very interesting records upon the migration of *Vanessa cardui*, which, appearing from the south in immense numbers, is supposed to come from Africa, assisted by the warm winds in spring; and, as has been noted in England, the painted lady is usually accompanied by *Plusia gamma*. *Sphinx convolvuli* is in the same way cited as migrating to Europe from Algeria. W. M.

Wayside and Woodland Blossoms: a Pocket Guide to British Wild Flowers, for the Country Rambler. By Edward Step. 173 pp., with 128 coloured and 22 plain plates. London and New York: Frederick Warne & Co. 1895.

The author, putting aside technicalities to a large extent, has prepared a convenient guide for the plant-collector; and the descriptions, which are written in a clear and intelligible manner, together with the figures, should enable any one to determine almost every species of wild plant that he may meet with in his wanderings, or that he may wish to become acquainted with.

To the entomologist, and especially to the lepidopterist, a knowledge of field botany is of considerable importance. To those, therefore, interested in insects and desiring to learn how to know and where to find the plants upon which they feed, we can commend this handy little volume.

A Plum-Scale in Western New York. By M. V. Slingerland. Bulletin 83, Cornell University Agricultural Experiment Station, Entomological Division. Dec., 1894.

A "plum-scale" has recently been noticed to seriously menace the welfare of plum-trees in New York orchards. It seems, however, that so far the life-history details of the pest have not been fully ascertained, and that even its name has not been determined beyond the fact that it is a species of *Lecanium*, possibly *L. juglandis*, Bouché. Although it chiefly attacks plum-trees, the "scale" has been observed on other fruit-trees in a lesser degree. Mr. Slingerland recommends "spraying the infested trees with kerosine emulsion diluted with four parts of water," and impresses upon the operator the paramount importance of hitting each little scale with the liquid.

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DESCRIPTIONS OF SOME NEW SPECIES OF SOUTH AMERICAN CHRYSOMELINÆ.

By Martin Jacoby, F.E.S.

In 1876 Kirsch has described, in the 'Deutsche Ent. Zeitsch.,' some species of *Doryphora*, and placed them in the genus *Chrysomela*, under which heading they figure also in the Catalogue of Duvivier. It is most remarkable that, although the genus *Doryphora* is about the most easily to recognize amongst the whole of the *Phytophaga*, and Kirsch knew well apparently this genus, he should have retained the name of *Chrysomela* for it, since this genus has no true representative in South America.

Doryphora sanguinipennis, n. sp.

Below metallic violaceous; head and thorax black, shining, nearly impunctate; elytra light red, very finely punctured in irregular rows, the sutural and lateral margins narrowly black. Length, 9 lines.

Head black, impunctate at the vertex; the clypeus very finely and sparingly punctured; the eight lower joints of the antennæ black, the others wanting; thorax strongly transversely convex, at least three times broader than long, the sides strongly rounded, narrowed at the base, the anterior angles mucronate, the disc shining, with some very fine punctures at the sides only, the centre impunctate, with a small fovea at the sides; scutellum black; elytra very convex, parallel, of reddish orange colour, very narrowly margined with black, the surface very finely, not very closely, punctured, the punctures very irregularly arranged in rows, the interstices impunctate; under side and legs violaceous blue; mesosternal process moderately long, acute, slightly curved.

Hab. Venezuela (my collection).

This large-sized species is of similar shape as *D. batesi*, and seems allied to *D. augur*, Stal, in coloration, but differs in the nearly impunctate thorax and the finely punctured elytra.

Doryphora obliquefasciata, n. sp.

Black; head and thorax greenish, opaque, finely punctured; elytra closely geminate punctate-striate, flavous, the suture and two transverse oblique bands, one before, the other below the middle, piceous or greenish. Length, 5 lines.

Head opaque, greenish, scarcely perceptibly punctured; labrum flavous; antennæ black, the lower two joints and the apex of the last one fulvous, the sixth to the eleventh joints widened, scarcely longer than broad; thorax three times broader than long, opaque, greenish, the sides straight at the base, rounded towards the middle and slightly widened, the anterior angles mucronate, the surface irregularly and very finely punctured, the punctures of equal size; scutellum black; elytra rather suddenly deflexed from the middle to the apex, strongly punctured in closely approached double and treble rows; the sutural margins greenish black, slightly widened towards the apex; a transverse curved band before the middle, not extending to the lateral margin, and another semicrescent band from the middle of the suture to the apex, but also interrupted at the latter place, piceous or greenish; the extreme lateral margin and the elytral epipleuræ blackish, as well as the under side and legs; mesosternal process long and curved.

Hab. Cameta, Amazons; also Para, Brazils (collections, M. Oberthur's and my own).

To be separated by the position, number, and shape of the elytral bands, and the colour of the suture, &c.

DORYPHORA MATHAMI, n. sp.

Greenish-æneous; thorax finely punctured, the sides pale greenish; elytra geminate, punctate-striate, pale greenish, a sutural band, widened towards the middle, greenish-æneous. Length, 4 lines.

Head greenish-æneous, very finely and somewhat closely punctured; labrum fulvous; antennæ metallic bluish or purplish, the lower two joints flavous below, the terminal joints widened; thorax about twice and a half broader than long, the sides nearly straight, anterior angles not mucronate, but pointed, the disc finely and irregularly punctured throughout, the centre occupied by a broad posteriorly widened æneous band, the sides pale greenish; scutellum æneous; elytra with about eight double rows of punctures, rather irregularly geminate, the punctures fine and piceous in colour, the disc pale greenish, a narrow sutural band, gradually widened at the middle, greenish-æneous; elytral epipleuræ pale greenish; under side and legs nearly black, with a metallic greenish gloss; mesosternal process short and stout; claw-joint without tooth.

Hab. St. Paulo d'Olivença (M. de Matham; collections, M. Oberthur's and my own).

Allied in coloration to *D. axillaris*, Stal, but differing entirely in the punctuation of the elytra and shape of the sutural band.

DORYPHORA PERUANA, n. sp.

Below greenish-black, above dark purplish; thorax finely and closely punctured, subopaque, the extreme lateral margin flavous; elytra very closely punctate-striate, each with four flavous small spots (1. 2. 1.). Length, 5 lines.

Head opaque, greenish, extremely finely but not very closely punctured; labrum flavous; antennæ blackish, the lower two joints flavous below, terminal joints moderately widened, longer than broad; thorax three times broader than long, the sides straight, rounded only in front of the anterior angles, the latter pointed, the surface very finely punctured, the punctures closely placed at the sides, more distantly at the middle, where there is a narrow smooth longitudinal space, the colour greenish, opaque, or darker purplish; elytra scarcely widened posteriorly, dark purplish, very closely and rather strongly punctured in semiregular rows, a small round spot at the middle of the basal margin, two others placed transversely at the middle, and a fourth near the suture and the apex, bright flavous; mesosternal process ong and straight.

Hab. Peru (M. de Matham; collections, M. Oberthur's and my own); also Amazons (Staudinger).

This species may be known principally by the flavous lateral margin of the thorax, and the sculpture and number of spots on the elytra; it seems allied to *D. fulvopustulata*, Baly, but differs in the elytral puncturing and number of the spots.

DORYPHORA BARTLETTI, n. sp.

Fulvous; the head with two, the thorax with four greenish spots, finely punctured; elytra finely punctate-striate, piceous, the third interspace and a narrow sublateral stripe, joined at the apex and at the base, flavous. Length, 3 lines.

Head finely granulate, with a few minute punctures at the vertex, fulvous, with two obscure metallic green elongate spots; labrum flavous; antennæ extending to the base of the thorax, the terminal five joints transversely widened, broader than long, the basal two joints stained with greenish-æneous above; thorax transverse, about three times broader than long, the sides perfectly straight, only rounded near the anterior angles, the latter mucronate, disc minutely granulate and sparingly punctured, like the head, fulvous, all the margins and four large spots placed transversely, greenish, slightly metallic; elytra very finely punctate-striate, the three sutural striæ regular, the others less so, a sutural broad and a lateral narrow band piceous, the third interstice as well as the ninth narrowly fulvous, the disc occupied by a broad somewhat irregularly-shaped piceous band, nearly divided at the middle by a flavous transverse stripe, the basal margin also flavous, and connecting the two elytral flavous stripes; elytral epipleuræ, under side, and legs fulvous; mesosternal process short and straight; legs with some obscure metallic greenish marks.

Hab. Peru, Yurimaguas (Bartlett; my collection).

Allied to *D. amabilis*, Baly, but differing in the finely granulate head and thorax, and in the elytral subsutural flavous stripe.

DORYPHORA PICEO-MACULATA, n. sp.

Piceous; the apical joints of the antennæ fulvous; thorax finely and remotely punctured; elytra olive-green, finely and closely punctate-striate, a sutural band strongly widened anteriorly, the lateral margins, a spot before and three other spots, placed transversely below the middle, piceous. Length, 7 lines.

Head finely and rather closely punctured; labrum fulvous; antennæ only extending to the base of the thorax, piceous, the last four joints fulvous, slightly widened; thorax three times broader than long, the sides very slightly rounded, the anterior angles thickened but scarcely produced, the surface convex, piceous, finely, irregularly, and remotely punctured throughout; scutellum piceous; elytra finely and rather closely punctate-striate, the punctures slightly geminately arranged; a narrow sutural band, which suddenly widens into a transversely-shaped patch below the scutellum, the lateral margins narrowly, a small spot placed below the base close to the sutural mark, and three similar spots placed transversely below the middle, as well as a spot at the base above the shoulders, piceous; mesosternal process short and stout.

Hab. St. Paulo d'Olivença (M. de Matham).

Of this species, which is nearly similarly marked to *D. javeti*, Baly, I received a specimen from Mons. Oberthur. It differs entirely from that species in the punctuation of the thorax and the elytra, and in their olive-green colour. In *D. javeti* the thorax is less transverse, more strongly punctured, and the elytral punctuation is finer and more remote.

DORYPHORA SEMIFULVA, n. sp.

Metallic greenish or bluish; the head with a fulvous spot; thorax very finely punctured; elytra fulvous, very finely and rather irregularly punctured, the interstices here and there finely aciculate. Length, 5—6 lines.

Head very finely and sparingly punctured, metallic green or blue, the vertex with a subtriangular fulvous spot, labrum piceous; antennæ extending to the base of the elytra, dark purplish, the terminal joints opaque, widened; thorax three times broader than long, metallic green or blackish, the sides straight at the base, rounded at the apex, the anterior angles mucronate, the disc very finely punctured, the punctures irregularly placed, slightly larger and more remote at the sides than at the disc; scutellum metallic green; elytra fulvous, with some very obscure darker patches or spots, finely, irregularly but rather closely punctured, the interstices here and there finely aciculate; mesosternal process strong but blunt, moderately long; claw-joint not toothed.

Hab. Bolivia (my collection).

Of the same coloration as *Cryptostetha procera*, Stal (*rufipennis*, Baly); but a true *Doryphora*, on account of the strongly produced mesosternum.

STILODES BOGOTAENSIS, n. sp.

Fulvous; lower joints of the antennæ black, the apical ones flavous; thorax with four black spots at base and apex; elytra bright flavous, a sutural band and two triangular patches before and below the middle, as well as the lateral margin, bluish black. Length, 3½ lines.

Head impunctate, reddish fulvous; lower six joints of the antennæ black above, the basal two flavous below, the terminal five joints pale flavous, widened; thorax nearly three times broader than long, the sides nearly straight, the anterior margin deeply concave, the surface reddish fulvous, remotely but distinctly punctured, two spots at the middle of the anterior margin and two larger ones at the base, all of transverse shape, black; scutellum black, elongate; elytra finely punctate-striate, the punctures extremely closely placed, the rows near the suture of irregular direction, the ground colour bright golden yellow, the suture with a broad dark blue band, narrowed at each end, the disc with a triangular blue patch from the base to the middle, and a somewhat smaller one near the apex, none of the patches extending to either margin (the posterior patch on one elytron is joined at one place to the sutural band below the middle), the lateral margin also blackish blue, this colour of wider shape from the middle to the apex; under side and legs fulvous; sides of the breast piceous; prosternum slightly raised; mesosternum strongly punctured.

Hab. Bogota.

This handsome species, of which I possess a single specimen, agrees almost entirely with *S. steinheili*, Jac., in the pattern and colour of the elytra, but differs in that of the antennæ, under side, and legs, and the spotted thorax.

DEUTEROCAMPTA TRANSVERSO-FASCIATA, n. sp.

Dark fulvous; labrum testaceous; thorax very remotely punctured; elytra regularly punctate-striate, flavous, a broad transverse band before, another below the middle and the sutural and lateral margins, narrowly dark brown. Length, 4 lines.

Head impunctate; labrum flavous; antennæ dark fulvous, the basal two or three joints paler, terminal joint longer than broad, extending to the base of the elytra only; thorax nearly three times broader than long, the sides straight at the base, slightly rounded in front, anterior angles produced forward, surface very remotely and irregularly punctured; elytra with rather regular striæ of fine punctures, those at the sides geminate, the sutural, lateral, and apical margins dark brown; a similarly coloured broad band is placed across the elytra before and another one below the middle, the former band does not extend to the lateral margin, but the posterior one is joined to it by a small point; mesosternum impunctate at the sides; claws simple.

Hab. Pernambuco.

Of this species two specimens are contained in my collection: one is marked as described; in the other the posterior band is of much broader, more triangular shape, narrowed at the suture, and does not touch the lateral margin; the apical joints of the antennæ in this specimen are also black instead of brown; otherwise there is no difference.

S. nigrozonata, Stal, seems a closely-allied species, but the antennæ, tibiæ, and tarsi are described as testaceous, and the elytra as "confusely punctured at the sides"; the abdomen is also said to have two testaceous spots.

CRYPTOSTETHA CYANEO-FASCIATA, n. sp.

Metallic blue; head and thorax opaque, impunctate; elytra deeply and closely punctured, the interstices rugosely convex, flavous, a deeply dentate and broad transverse band at the base, a narrower one at the middle and another near the apex, dark blue. Length, 5 lines.

Head opaque, dark blue, the vertex with a fulvous spot, finely granulate, with a few fine punctures anteriorly; labrum and palpi black; antennæ short, the terminal joints transversely widened, black, the lower joints shining; thorax three times broader than long, the sides very strongly widened and rounded at the middle, the surface sculptured like the head, with a few minute punctures at the sides; scutellum blackish; elytra very deeply almost foveolate-punctate, the punctures irregularly distributed, the interstices everywhere variolose or convex, a sutural and lateral narrow band, as well as three transverse very deeply dentate bands, dark blue, separated by narrow similarly dentate flavous intervals; the anterior two bands extend to either margin, but the apical one is shorter and does not touch the suture; the first band is very broad and of even width, but intersected by the narrow flavous basal margin and a narrow similarly-coloured stripe near the suture; the second band at the middle is greatly narrowed at the sutural portion and follows the first band in its indentations; lastly, the apical band is irregular in outline and does not extend to the suture; the under side and legs are metallic blue; the mesosternum is perpendicularly deflexed, as in all the species of this genus.

Hab. Rio grande do Sul, Brazils.

I have received two specimens of this handsome species from Dr. Staudinger; the system of coloration resembles nearly *C. dolabrata*, Stal, but the sculpture of the thorax and of the elytra is quite different.

THE RHOPALOCERA OF FLEET (NORTH HANTS) AND DISTRICT.

By S. G. C. Russell, F.E.S.

I was much interested in Mr. Grover's paper on the Rhopalocera of Guildford (*ante*, p. 150), and a similar account of the butterflies occurring at or near Fleet may be of some interest to entomologists. I have collected in the district regularly for the last five years (although I have had a much longer experience of it), and the insects enumerated below—a total of thirty-seven species—comprise only those personally taken or seen :—

Pieris brassicæ. In some seasons abundant.—*P. napi* and *P. rapæ.* Common.

Leucophasia sinapis. Mr. F. W. Frohawk, when I had the pleasure of his company in May, 1890, took a single specimen at Ewshot, and this is the only occasion on which I have met with this species in the district. By the way, there appears to be a somewhat general impression that this butterfly is seldom taken at rest. Quite the contrary was my experience at Sidmouth in 1893, when I took it in considerable numbers. The majority were taken at rest on flowers of some kind of vetch, evidently its food-plant. I have also taken the insect this year in Northamptonshire, and as far as I conld see it settled indiscriminately on any flower that happened in its way.

Euchloë cardamines. Abundant.

Colias edusa. Plentiful in 1892 (the *edusa* year), when specimens of the var. *helice* were also taken.—*C. hyale.* A few taken or seen in 1892, flying with *C. edusa.*

Gonopteryx rhamni. Very abundant, especially in the spring. Ova and larvæ are easily found on buckthorn (*Rhamnus catharticus*).

Argynnis selene. Very plentiful. A few specimens of a second brood occur in August.—*A. euphrosyne.* Common.—*A. adippe.* Fairly plentiful.—*A. paphia.* Fairly plentiful. I have not met with the var. *valesina.*

Melitæa aurinia (*artemis*). I did not meet with this species until 1892, and since then I have found its headquarters, where it occurs in some numbers, but is apparently restricted to a single field or meadow.

Vanessa polychloros. Occurs sparingly each year.—*V. urticæ*, *V. io*, *V. atalanta*, and *V. cardui.* Abundant in favourable seasons.

Apatura iris. A dead female found under an oak-tree ; and I am under the impression that I have seen specimens flying round oak-trees.

Pararge egeria and *P. megæra.* Common.

Satyrus semele. Abundant on heath-land.

Epinephele ianira, *E. tithonus*, and *E. hyperanthus.* Common.

Cænonympha pamphilus. Common.

Thecla quercus. In 1888, when with two brother collectors, this species was found swarming round small birch-trees in a copse. Is not this an unusual occurrence ? I have not since seen this species in any numbers.—*T. rubi.* A few specimens occasionally seen ; probably locally common.

Polyommatus phlæas. Common.

Lycæna ægon. Very abundant on heath-land.—*L. alexis.* Common. —*L. argiolus.* Occurs in the spring, but not very commonly.

Nemeobius lucina. Locally abundant.

Syrichthus malvæ (*alveolus*). Common.

Nisoniades tages. Common.

Hesperia thaumas (*linea*) and *H. sylvanus.* Common.

Woking, June, 1895.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 181.)

Agrotis saucia, *Hb.* — Very local and usually scarce. I have noticed the following forms:—With unicolorous vinous coloration, ab. *rufa*, Tutt, Glandore and Castle Bellingham. Blackish grey with pale costa, ab. *ochrea costa*, Tutt, Howth, Derry, and Glandore. The same with vinous costa, ab. *saucia*, Hb., Howth. Pale brownish, Kingstown and Castle Bellingham. A dark form with obscure markings, Derry, ab. *majuscula*, Haw.? Localities:—"Dublin in 1855" (*B.*); near Kingstown, one; Howth, not scarce (*G. V. H.*); three at Tinahely, Co. Wicklow (*Bw.*); Killynon, several (*Miss R.*), and Cromlyn, formerly abundant (*Mrs. B.*), Co. Westmeath; Belfast, not rare (*Bw.*); Magilligan, one; Curzon, and near Derry and the coast of Antrim, abundant (*C.*); Kylemore, Connemara (*Hon. Miss Lawless*); Clonbrock, a few (*R. E. D.*), and Galway; near Crossmolina Co. Mayo, abundant (*S. R. F.*); Glandore, Co. Cork, not scarce (*D.*); Castle Bellingham, Co. Louth, in some numbers (*Thornhill*).

Agrotis segetum, *Schiff.*—Everywhere common. The vars. *subatratus*, Haw., and *nigricornutus*, Haw., are not uncommon. Var. *caliginosa*, Esp., and var. *fuscosa*, Esp., also occur.

Agrotis lunigera, *St.*—Local, and, I believe, widely distributed in Ireland, and often abundant. Until the wilder districts of the coast are more accessible for research by railways, hotels, or available lodgings, little can be known of the distribution of such littoral species as this. Although usually met with on rocky cliffs and wind-swept elevations, this insect also may be found on low reaches of shore. The larvæ may sometimes be found sheltered under solitary tufts of grass growing in the chinks of bare walls of rock. I am not familiar with English specimens such as those described by Mr. Tutt in 'British Noctuæ.' He speaks of the two sexes approximating often in colour and marking, even (in var. *suffusa*) "the hind wings of the males as dark on outer margin as in females." I have never seen this in Irish examples, and a large number have been examined or taken by me from time to time; the female here being always very distinct from the other sex; Mr. Tutt's description of var. *suffusa* well describes it, only varying in the intensity of the blackish ground and size of the white orbicular, which is sometimes much reduced. Generally the transverse lines are obsolete, and I have one very dark example with the ante-marginal line represented by a series of minute pale dots. I have not seen the var. *nigra*, Tutt, with both stigmata wholly or almost obliterated. Stephens's description of the type represents the strongly mottled form of the male commonly met with here, but I have never seen the rich fuscous colour, "variegated with yellowish." The male var. *pallida*, Tutt, is also met with, the ground being greyish white (without, however, the "slaty tinge"), and all striæ and markings strongly defined. The handsomest examples that have come under my notice of this form were taken by the Messrs. Thornhill, of Castle Bellingham. It also occurs at Dursey Island. Mr. Tutt's var. *virgata* is a not uncommon aberration, with a dark transverse band enveloping the reniform stigma, and a dark hind marginal area. Mr. Thornhill has also a remarkable male example of a uniform warm brown ground similar to that of the ordinary *A. exclamationis*, shaded with bands and striæ of darker brown, but almost as indistinctly as in *A. ypsilon*. Localities:—Abundant at Howth and Castle Bellingham (*Thornhill*), and I found it very abundant at Dursey Island on the coast of Kerry. It also exists on the Blaskets, Roche's Point, near Queenstown, and "on the coast of Cork," by Mr. Clear (*B.*).

AGROTIS EXCLAMATIONIS, *L.* — Universally distributed and common, and with all varieties of ground colour, from pale clear brownish grey (var. *pallida*, Tutt) and rich ruddy brown (*brunnea*, Tutt) to a dark bistre brown. One or more of the stigmata are in some examples obsolete, or in some cases confluent, as in var. *plaga*, St.; and I have one example of var. *lineolata*, Tutt, figured by Newman. I have not met with var. *juncta*. Mr. Langham, of Tempo Manor, Co. Fermanagh, has a specimen with the reniform and claviform stigmata confluent, and a suffusion towards the base of wing. Mr. Thornhill has a fine example of var. *costata*, Tutt.

AGROTIS CORTICEA, *Hb.*—Local and sometimes fairly numerous. Varies from specimens with central area whitish grey (var. *irrorata pallida*, Tutt), through smoky grey forms, such as *irrorata fusca*, Tutt, and *subfuscus*, Haw., to a reddish brown with costal margin deeper in tone (the type), to blackish forms. It is by no means commonly met with in Ireland, and I have but few localities recorded for it. Tinahely, occasional (*Bw.*), and Greystones, Co. Wicklow, one; Castle Bellingham, Co. Louth, rather

scarce (*Thornhill*); Castlerock, Co. Antrim (*Bw.*); rare at Sligo (*Russ*); near Derry, one (*C.*); Clonbrock, Co. Galway, two (*R. E. D.*); near Kenmare, Co. Kerry, abundant.

[AGROTIS RIPÆ, *Hb.*—Mr. Birchall gives Malahide sandhills (Co. Dublin) as a locality, but as it has not been met with there or elsewhere, it may be possible that a form of *cursoria* with rather pale hind wings may have been mistaken for this species.]

AGROTIS CURSORIA, *Hufn.*—Locally abundant and apparently widespread on the Irish coast. It varies greatly in tints of ochreous to brown, but I have seen no approach to the slaty grey of var. *cærulea*, Tutt, nor in design to those with white reniform and orbicular stigmata from Shetland and Yarmouth. The darkest specimens I have met with are a few with ground colour of a cold bistre brown, well marked with transverse striæ, &c. Of named forms the following occur:—With obsolete markings, var. *armena*, Evers., Sligo (*Tutt*) and Arklow; and single specimens of unicolorous reddish brown, (?) var. *obscura*, Stgr., Ballinskelligs Bay and Drumanweir, Co. Donegal (*G. V. H.*). Var. *mixta*, Fab. is recorded by Mr. Tutt from Sligo. It is not uncommon at Magilligan Point, L. Foyle; near Donegal; and elsewhere. Var. *pallida*, Tutt, I have from Sligo and Arklow. Vars. *ochrea* and *brunnea*, Tutt, are recorded by him from Sligo. Localities:—Inver near Donegal, Carrablagh, and Drumanweir (*G. V. H.*); Bundoran (*W.*), and Buncrana (*C.*), Co. Donegal; Magilligan Point, L. Foyle, abundant; Castlerock, Co. Antrim (*Bw.*); Dundrum, Co. Down, scarce (*W.*); Castle Bellingham, Co. Louth (*Thornhill*); Arklow, Co. Wicklow; Youghal; Ballinskelligs Bay, Co. Kerry, abundant; and Knocknarea and Lissadell sandhills, Co. Sligo, abundant.

AGROTIS NIGRICANS, *L.*—Generally distributed and often fairly numerous. It varies by no means as much as in Great Britain. I have seen none of the very pale grey and reddish varieties. At Howth dark examples with warm brown ground are frequent, as well as blackish forms. The palest brown Irish specimens I have seen were taken at Castlerock, Co. Antrim, by Mr. Bristow. At Clogher Head, Co. Louth, the species is abundant, and I took there a nice series of very dark forms such as vars. *fuliginea*, *fumosa*, and *ursina*, Godt. I have an interesting aberration from Howth of a greyish brown ground colour, with the reniform and orbicular stigmata fused into a dark streak, that on the left wing preserving the orbicular without alteration of shape on the outer edge. Near Derry, scarce (*C.*). I have but few localities noted besides the above, but the species is very widespread in the south, and in Galway in the west, but scarcer inland.

AGROTIS TRITICI, *L.*—This very common moth seems in Ireland to be always of some tone of warm brown, except the darkest forms, which approach a sooty black. In Tutt's 'British Noctuæ' the prevailing colour of Irish specimens is correctly given as brown or reddish brown. Having collected this species in many localities in every littoral county in Ireland except Antrim, Down, Mayo, and Clare, I can speak from an extended experience. Irish *cursoria* and *tritici* therefore do not seem to run so nearly into one another as I believe they do elsewhere, neither species showing in Ireland such a range of colour-variation. Some forms of *tritici* without the costal and other streaks may approach the *cursoria* pattern, but the ground colour, as well as usually the shape of the wings, sufficiently distinguishes them. I have very rarely seen any of this species with any approach to greyish dusting, a character so strongly developed in some English specimens; nor have I ever met with the ochreous yellowish form. A rich brownish red, approaching the tint of *Noctua plecta*, sometimes occurs. The handsome dark varieties, variously marked, are found with the ordinary forms at Magilligan Point, Co. Derry; on the shores of L. Swilly, Co. Donegal, and elsewhere, but are scarce. The var. *aquilina*, formerly classed as a species, is not infrequent in many places. In size I have examples from one and a half inch in expanse to fifteen-sixteenths of an inch, which latter are almost devoid of any markings, a character frequently attending dwarfing. As to the characteristic markings of this species, those with a pale costal and longitudinal streaks are much less numerous generally than those without. I possess a few examples of the latter devoid also of the transverse markings. All the forms described by Tutt under letters H. I. K. L. occur, except var. *hortorum*, St.

[AGROTIS AQUILINA.—See under *tritici*.]

AGROTIS OBELISCA, *Hb.*—Very local, and decidedly scarce. I have seen none with the greyish coloration of Mr. Hodge's Isle of Wight specimens, and they rarely have such pale and distinct reniform and orbicular stigmata. The ground colour varies from vinous reddish brown to a dull mahogany, and the costa is sometimes ochreous, but occasionally, in the darker specimens, very slightly marked in paler tint of the ground colour. Mr. Birchall remarks that this species haunts the higher parts of Howth, while *tritici* rarely leaves the level of the sandhills. Besides that locality I have only met with *obelisca* on the cliffs of Minehead, near Dungarvan, Co. Waterford; and at Mt. Charles, Donegal. Mr. Campbell's record from near Derry I find to have been a mistake.

AGROTIS AGATHINA, *Dup.*—The Irish examples of this species are generally large, one and a quarter to one and three-eighths inches, and brightly marked, but very variable in colour and strength of pattern. The lightest I have ever seen is in the collection of Mr. Maurice Fitzgibbon, of Howth. The putty-coloured ground is traversed by grey striæ, and bears the black wedge-shaped space upon which are the reniform and orbicular stigmata, which is thrown into bold relief by the pale ground and broad costal streak of same tint. I possess another of a lavender-grey ground, somewhat shaded on the central area; the costal streak broad and whitish, the stigmata large and pale, the transverse striæ broadly pencilled in black edged with pale; a very distinct white ante-marginal waved line, broadened at the anal angle, is margined by a greyish black shading, which partly absorbs the cuneiform dashes. Hind wings very pale, with the ordinary shade and markings well represented. There is also a lavender-grey form almost unmarked except by a narrow costal streak, and the dark wedge bearing two small stigmata. The costal streak is often almost obsolete and of the ground colour, and the stigmata vary from almost white to a ruddy brown. All the above are aberrations, and not, as far as I know, stable varieties. Most of them are to be taken at Howth, together with the ordinary vinous-tinted form; a purple-brown one of the dark colour of *A. strigula;* and a pale rose-coloured one, var. *rosea*, Tutt. I have also met with a very dark specimen at Howth, and Mr. Dillon one at Clonbrock approaching var. *scopariæ*, Mill., but of full size and distinctly marked. This insect seems to vary extremely in comparative abundance in successive seasons. Usually scarce, and occurring sparingly; I have on occasions found it in abundance on a very restricted area of heather. Mr. Birchall used to take it by sweeping at night, but the specimens suffer considerably. The female when taken *in cop.* lays her ova freely on heather twigs in confinement, but I have never succeeded in rearing the larvæ through the winter; and even when taken almost full fed, they rarely survive to pupate. Localities:—Howth; near Derry, not common (*C.*); Clonbrock, Co. Galway (*R. E. D.*).

AGROTIS STRIGULA, *Thnb.*—Widely and generally distributed through Ireland wherever there are bogs or heathery hills. The ordinary form is somewhat variable in colour, and in the strength of the white markings. Sometimes a browner tint is observable, and in such specimens the pale markings are fainter, especially the streaks on the hind margin. I have noticed one red specimen, perhaps the var. *marmorea*, Gras., from Westmeath. It is unnecessary to adduce localities. It is very abundant on the Bog of Allen near Shannon Harbour, and Toberdaly, King's Co.; on the slopes of Slieve Beagh on the Tyrone side; at Oughterard, Connemara; and is not uncommon at Howth, Derry (*C.*), &c.

AGROTIS (ACETEBIA) PRÆCOX.—Very widely spread on the Irish coast. The larvæ suffer much from ichneumons, and from seagulls, who trace their trail on the sand and dig them up. Sometimes rather abundant, as at Magilligan, Co. Derry; Tramore, Co. Waterford; Dundrum, Co. Down (*W.*). I have not seen the bluish green form *præceps*, Hb. Localities: – Howth, Malahide, and Kingstown, scarce, Co. Dublin; Greystones, Co. Wicklow, scarce; Wexford; Waterville, Co. Kerry; Lissadell, and near Sligo, not rare (*Russ*); Portrush, Portballintrae, and Castlerock (*J.*), Co. Antrim; Magilligan, frequent (*C.*).

AGROTIS SIMULANS, *Hufn.*—A few specimens have been taken near Sligo by Mr. Russ (Ent. Record, vol. ii. 212). They are lighter in tint than Scotch examples. This insect occurring in the Isle of Man, whose lepidopterous fauna is distinctly Irish, we may expect to find it occurring elsewhere on the Irish coast.

AGROTIS LUCERNEA. *L.*—The cinereous type and the grey var. *cataleuca*, Bdv., seem not to occur in Ireland. This species is here represented by the var. *renigera*, St., a dark leaden grey insect with darker bands and paler strigæ, similar to the South Wales form (*C. G. B.*); but at Howth I have met with occasional examples of lighter grey, intermediate between the usual form and those of the South of England. It rarely seems to occur in any numbers, though it is very generally distributed on the Irish coast, usually to be taken on dangerous cliffs. An obscure blackish grey form is to be found on the extreme western headlands of Kerry, which, as it appears a local variety, I propose to call var. *kerrensis*; I have met with it on Dursey Island, and on rock islets off the Kerry coast; it is of a bluish black colour, generally almost or entirely unicolorous; but sometimes the waved transverse strigæ are slightly marked in paler tone. Localities for type:—Howth, not uncommon, and Rockabill I., off the Dublin coast; Dunmore, and Saltee I., Co. Waterford; Roche's Point, Old Head of Kinsale, and Galley Head, Co. Cork; on the Kerry coast at many localities; near Galway (*A.*); at Magilligan in one night Mr. Curzon took thirty-six; at Benevenagh Mt., Co. Derry (*W.*); Castlerock, Co. Antrim (*Bw.*); Dundrum, Co. Down, scarce (*W.*).

NOCTUA GLAREOSA, *Esp.*—Very widely spread and sometimes locally (as at Howth) abundant. The whitish grey type, with reddish subterminal band, is the ordinary form. The var. *rosea*, Tutt, is not uncommon at Magilligan and Howth. I took at Kilderry, near Derry, a specimen of dull purplish grey with a darker subterminal band. Localities:—On the Dublin and Wicklow coasts; Cappagh and Dunmore, Co. Waterford; many localities in Co. Galway and Sligo; Cromlyn (*Mrs. B.*); Favour Royal, Co. Tyrone, scarce; Drumreaske, Monaghan; near Derry, fairly abundant (*C.*); Castlerock, numerous (*Bw.*); Ballycastle (*Curz.*), Co. Antrim; Black Mt., Belfast, abundant (*W.*).

NOCTUA AUGUR, *Fb.*—To be met with throughout Ireland, and often not uncommon. The Irish insect is of a dark warm fuscous, and very strongly marked with the usual characters in black. It varies slightly in the ruddy tinge, but I have never met with the cold greyish fuscous variety (*hippophaes*, Hb.) so common in England.

NOCTUA PLECTA, *L.*—Similarly distributed to the preceding. I have met with very richly coloured specimens of the reddish form. One example in my cabinet may be the *unimacula* of Stdgr., the orbicular stigma being almost entirely obsolete.

NOCTUA C-NIGRUM, *L.*—Many authors, according to Mr. Tutt, consider this insect as the female form of *ditrapezium;* but as I have never met with a specimen of the latter in Ireland, it is convenient to follow the nomenclature of most English writers. This moth is decidedly scarce in Ireland, so far as my experience goes. In most localities it occasionally turns up, but usually singly, though near Derry (*C.*) and Castle Bellingham (*Thornhill*), Clonbrock (*R. E. D.*), and in some localities in the south it is not rare. Localities:—King's Co.; Sligo; Tyrone; Monaghan; Armagh; Westmeath; Dublin; Kerry; Antrim; Fermanagh.

NOCTUA DITRAPEZIUM, *Bkh.*—Mr. Birchall records the capture of a pair at sugar, at Kilcornan, Co. Galway, in 1857.

NOCTUA TRIANGULUM, *Hufn.*—Widely distributed and sometimes pretty common, but far scarcer than it usually is in England. The form appears to be the var. *intermedia*, Tutt (var. *sigma*, Haw.).

NOCTUA BRUNNEA, *Fb.*—Widely distributed and often locally plentiful. It varies greatly in colour and markings. I think the purplish brown form is the most common in Ireland, referred by Mr. Tutt to var. *lucifera*, Esp. Also specimens sometimes occur of a clear brownish red, with markings and an ante-marginal band of a deeper tone, probably var. *rufa*, Tutt. There are also examples in my collection from Renvyle, Connemara; Markree Castle, Sligo; and Drumreaske, Monaghan, of a dark brown with shadings rather obsolete, except the black quadrate character between the stigmata, probably var. *nigricans*, Homeyer. Localities:—At Derry (*C.*); Belfast (*W.*); Favour Royal, Tyrone, and Drumreaske, Co. Monaghan, abundant; at Markree Castle, Sligo, Killynon and Cromlyn (*Mrs. B.*), Westmeath, Armagh (*J.*), Clonbrock, Co. Galway (*R. E. D.*), not very plentiful. I have also taken it in more or less abundance at Howth, and in the counties of Wicklow, Waterford, Kerry, &c.

NOCTUA FESTIVA, *Hb.*—To be found throughout Ireland commonly. The varieties are very numerous, and grade into each other in a most perplexing manner. Forms with purplish red ground colour such as Hübner's type are very scarce. I have but a single specimen, which, however, does not conform to any described variety in that it has a red base to the wings.

Var. *congener*, Hb.—One specimen from Markree Castle, Sligo, of a dark reddish brown.

Of var. *conflua*, H. S. (following Mr. Tutt's diagnosis of the form), I have a specimen from Tyrone.

Var. *rufo-virgata*, Tutt, seems pretty common; while *mendica*, Fb., is the commonest variety of the red ochreous group.

Var. *ignicola*, H. S., is decidedly rare. I have a few specimens also of the same ground colour, but without any markings, being almost unicolorous. One of them is over one and a half inches in expanse, and has a slight indication of the subterminal band; the stigmata, which are of the ground colour, are outlined in pale, and the lower lobe of the reniform is filled with a dark shade, which is the darkest marking on the wing.

Var. *ochreo-virgata*, Tutt, sometimes occurs. I have two with a strongly marked median band, deeply elbowed in the middle to a V shape. It is a very curious aberration.

Var. *primulæ*, Esp., is very common at Howth, and elsewhere occasionally found. Often very unicolorous, except the two dark blotches on each side of the orbicular and one spot below it.

The var. *grisea*, Tutt, also occurs, but is very rare. I have two examples (from Toberdaly, King's Co., and Markree Castle, Co. Sligo) which approach Mr. Tutt's var. *cærulea*, with a lavender-suffused ground colour, the median and ante-marginal bands being well marked and ruddy. There are no quadrate markings. A strikingly handsome form.

(To be continued.)

NOTES AND OBSERVATIONS.

The late Mr. Machin's Sale.—Referring to Mr. C. A. Briggs' no doubt well-meant but somewhat testy comment on my report of the sale of Mr. Machin's Macro-Lepidoptera at Stevens's (*ante*, p. 158), it happens oddly enough that the notes on the Diurni (only) were written in collaboration with a well-known specialist of that group. Mr. Briggs has, however, invited me to make a second and more complete examination of the specimens in question. I will therefore, with the Editor's kind permission, defer my reply until I have had an opportunity of doing so.—Thos. Wm. Hall.

The O'Reilly Sale. — The sale of The O'Reilly collection at Stevens's, on the 30th of April, once again illustrates the importance, both from an economic and commercial point of view, of having all specimens properly labelled, with full data of time and place of capture. The collection under notice was a small one, and from all appearances had not been added to for several years; the specimens were in fair condition, but contained no rarities and but few varieties. The first two lots, consisting, *inter alia*, of five and six specimens of *Aporia cratægi*, fell to the writer at 6/– each. Had the collectors present been made aware of the fact that The O'Reilly bred all these specimens himself from larvæ he took in Abbots Wood some fifteen or twenty years ago, a much larger price would have been obtained. Lot 13—containing a female *Colias edusa*, with nearly spotless margins, and some nice *helice*

—realised their full value, £2 5s. Lot 6 fetched £2, and contained a very nice banded form of *Argynnis selene.* The nicest var. in the Argynnidæ, and indeed, to my mind, in the sale, was a nearly black specimen of *Melitæa athalia* from Abbots Wood. This was by no means dear at £3 5s. There were nine bred specimens of *Lælia cænosa*, all purchased by a Devonshire collector for £4 6s. Lots 46, 47, and 48 contained, *inter alia*, ten specimens of *Bryophila algæ*, said to have been taken at Brighton. I believe Dr. Sequeira acquired seven, with numerous other things, for 17/–; and Mr. Hayward, three for 8/–. If these be genuine, it is evidently not a fact, as most of us imagined, that there are only two authenticated British specimens of this rarity, both of which are supposed to be safely located up north. Altogether the collection, with cabinet, realised some £75. Messrs. Stevens also sold, on the same day, four specimens of *Chrysophanus dispar*, all more or less imperfect, which realised £2 2s., £1 15s., £1 17s. 6d., and £1 17s. 6d.—Thos. Wm. Hall.

Mr. J. E. Robson's Sale. — The first portion of Mr. Robson's collection, consisting of the Macro-Lepidoptera (less the Geometræ), was sold at Stevens's on June 11th. At Mr. Machin's sale unusually high prices had to be noted. In this instance the limit appears to have been reached in the other direction. That the collection was rich in varieties was undeniable. The condition of the specimens was, in my opinion, quite equal to those above referred to. Unlike The O'Reilly's collection, nearly every insect bore on its individual pin a label with full particulars of locality, &c.; and yet in very many instances good insects were sold for a quarter the price even the most moderate working entomologist would have charged for the mere setting, let alone their acquisition. As usual some vars. of the Diurni fetched good prices, notably a fine *Colias hyale* (Lot 6), suffused to the central spot and figured in Barrett and Mosley, £4 10s. A fine *Lycæna alexis*, similar to Newman's figure, went, after a smart competition, for £5 10s. A *Vanessa atalanta* var. of under side, and upper side red band on hind wings without usual black spot, also figured by Mosley, 35/–. A var. of *V. urticæ* like Newman's figure 4, £4 8s. The gem of the collection was a suffused var. of *Argynnis aglaia*, purchased on apparently an open competition for £9. Some nice local northern forms of *Melitæa artemis*, with vars. of *M. cinxia*, realised £2 15s. A very nice form of *A. paphia* with dark costal blotch only realised 20/–, a very much inferior price to what a very similar form brought a sale or two back. Against this a specimen of *Limenitis sibylla*, with partly obscured band, only fetched 6/–. 59 good specimens of *Apatura iris* (6), *L. sibylla* (7), *L. ægon*, and *Nemeobius lucina*, only 7/– the lot. Two lots of over 100 specimens of *L. corydon*, *L. adonis*, and *L. alexis*, including some pretty forms, only 6/– the lot. Three *Vanessa antiopa*, and others, 10/–. A fine picked series of *Epinephele hyperanthus* and *E. tithonus*, 6/–. A ditto of *Macroglossa bombyliformis*, *M. fuciformis*, *M. stellatarum*, and one *Chærocampa nerii*, from Dr. Hunter's collection, only 8/– the lot. Three authenticated *C. celerio*, with others, 8/–. Four *Deilephila galii* (2, Mr. Capper), and others, 8/–. *Lælia cænosa*, two pairs, 16/– a pair; one pair not quite so good, only 5/–. The prominents and Noctuæ were, with very few exceptions, almost given away. 82 specimens of *Heterogenea asellus*, *H. testudo*, *Drepana hamula*, and others 5/–. 67 of *Notodonta carmelita*. *N. dodonea*, *N. chaonia*, &c., 6/–. 77 of *Ptilophora plumigera*, *Pygæra anachoreta* (Dr. Knaggs), and others, 4/–. 91 of *Hydræcia nictitans*, including var. *paludis*, &c., 3/–. 89 of *Xylomiges conspicillaris* (2, Mrs. Hutchinson), and other good things, 7/–. 173 specimens of *Apamea ophiogramma*, and others, 3/–. A fine series of *Noctua festiva* from some thirteen or fourteen different localities, and including most known forms, 6/–. In most cases two, in many three, and in not a few four, lots had to be offered together, ere a purchaser could be found. The reasons are not, I think, far to seek. The lotting, done, I am given to understand, by or on behalf of Mr. Robson, locally, was badly done. The specimens were all huddled together so close that their merits were not properly appreciable; the sale was badly advertised; and last, but by no means least, it was held at a wrong time of the year. A few other lots, originally belonging to the Duchess of Mantua, were sold on the same day. My worthy critic acquired, amongst a lot of rubbish, a beautiful hermaphrodite *Gonopteryx rhamni* for a very low figure. The writer, like, I believe, every one else but our sharp-eyed friend, overlooked this until too late, but he did manage to get hold of a pair of *Chrysophanus dispar* for 35/–, the female being fine and perfect.—Thos. Wm. Hall.

Tenacity of Life in the Dragonfly.—On June 2nd last I captured, near Brockenhurst, a specimen of *Platetrum depressum*, which was decapitated upon coming into contact with the net. Four or five hours afterwards I found the body, which was pinned in my collecting-box, alive and moving about. The following day an example of *Libellula quadrimaculata*, which I obtained near Lyndhurst, was served in a similar manner, and this I found quite alive two or three hours afterwards. A specimen of *Æschna cyanea*, which I caught near Bromsgrove the year before last, although minus its head, clung with tenacity to anything it was put upon for at least half an hour after the accident happened.—W. Harcourt Bath.

Note on Hepialus humuli in Orkney.—This species is out here now. There is no sign of any marking on the wings of the male as in Shetland specimens, but in some examples the head is very dark. I have noticed that the male on emerging from pupa crawls up a stem just high enough to expand and dry its wings. At the proper time it commences its pendulous flight over the spot where the empty pupa-case is lying, and rarely moves more than a few inches from that spot. When the female comes along it knocks against the male, and the pair drop together. Should a male not be visited by a female he drops down on a stem of grass, and does not renew his flight until the following night. I marked the wings of one male for observation, and found that he did not attract a partner until the third night.—H. McArthur; Hoy, Orkney, N.B., June 16th, 1895.

Colour-changes in Plusia chrysitis.—With regard to the remarks of Mr. W. D. Thornhill, *ante*, p. 159, and of Mr. W. J. Kaye, *ante*, p. 181, concerning the above, I beg to state that in the last week I have taken *with the net* nine specimens of *P. chrysitis*, all in good condition, though some are slightly rubbed by the net. Five show the green bronze and four the golden. Two I took on June 18th were very perfect, one showing green bronze and one golden.—C. Northon Bunn; Magdala House, Fremington, N. Devon, June 20th, 1895.

Queries respecting the Killing and Preservation of Insects.—For a number of years I have taken great interest in the science of Entomology in all its branches, but up to the present various causes have prevented me taking an active part therein. I am now, however, desirous of undertaking the formation of a collection, general in its character, as opportunity serves; but should first like to definitely clear up, once for all, certain doubts which exist in my mind, even after an extensive perusal of entomological literature. The extreme annoyance it is, not to mention the heavy loss, when after providing expensive cabinets, &c., for your specimens, and after taking an infinity of trouble in their collection and preservation, you sooner or later find them more or less damaged by one or other of the pests hereinafter mentioned, as well as the importance of the subject, must be my excuse for trespassing upon the space of the 'Entomologist' for the required information:—

Firstly, with regard to killing. The cyanide-bottle seems to be the mode generally recommended and in use for all orders of insects. May I ask whether this poison is quite harmless to the colours of the specimens? If not, what other method is preferable?

Secondly, as to preservation. (a) *Moulds and mildew.*—Am I right in concluding that if insects are allowed to thoroughly dry on the setting-board before being placed in the cabinet, and the last-named receptacle be kept in a dry room where there is a fire daily, except in the summer, these evils cannot occur, and hence need not be feared? (b) *Mites.*—What is really the effectual preventive? I propose obtaining a cabinet, either mahogany or oak throughout, the drawers glazed with glass tops, in frames containing the camphor-cells, and the papered cork at the bottom painted over with a solution of either chloride of mercury or corrosive sublimate in alcohol, whichever is considered to be the better. The latter solution is stated to be not only fatal to insect-life and an absolute preventive against the mite, but also a powerful preservative; the strength of the solution to be such that when a white feather is dropped into the liquid and drawn across a piece of black cloth no trace remains after evaporation. I further understand that a set-insect may itself be held by the pin and dipped sideways into the said last-mentioned solution, so that every portion of the wings and body is thoroughly wetted, and afterwards stuck on a sheet of cork, when it will dry without the slightest injury to either the colours or condition. It is averred that after this treatment "no living insect will ever touch" the specimens. May I safely adopt the above treatment with all kinds of insects, whether British or Exotic, and is the result as represented? (c) *Grease.*—Is there any absolutely certain preventive against this by immersion in any solution or otherwise, or to make sure must all large-bodied moths and butterflies be treated before the contents of the bodies become hard, as described by the Rev. Joseph Greene on pages 77 and 78 of 'The Insect Hunter's Companion'? If the latter course be necessary, how can it be carried out, or, alternatively, what is advised to be done to prevent grease in the case of Exotic moths and butterflies which have been set for some time, and the contents of whose bodies have hardened?

Thirdly and lastly, with regard to the preparation of larvæ for the cabinet. It would appear the method of inflation, after removal of the contents of the body, in the majority of instances materially alters or affects the colour and shape of the specimens. Could not the natural colours and condition be permanently preserved by merely bottling, corking-up and sealing each larva, without removing contents of body, in a glass-tube filled with turpentine or spirits of wine, after the manner recommended for spiders? If so, which of the said two spirits is the better for the purpose? and what could be used, which would not yield to the action of the liquid, to stick or fix the specimen to the side of the tube in the fashion desired?

I must apologise for troubling you at this length, but I am encouraged by the couplet on the cover of the 'Entomologist'—

> "By mutual confidence and mutual aid
> Great deeds are done and great discoveries made."

Through which valuable medium I shall be glad to receive the aforesaid information.—J. R. Cattle; 115, King Edward Road, London, N.E., May 20th, 1895.

CAPTURES AND FIELD REPORTS.

Bombyx rubi bred.—I was successful whilst in Wales in breeding two female and one male specimen of *Bombyx rubi* out of only six larvæ obtained there last autumn. They were kept out of doors in a small box with glass front and two small apertures at the sides with perforated zinc; a piece of turf about two inches thick was placed in the bottom; the larvæ were fed on bramble, and all of them spun up this spring; but I found that two had died without turning to pupæ, and the other pupa had decayed. The first female emerged May 20th, apparently early, as I was unable to attract any males; the second emerged June 4th, and this time I was successful with three males, one of which I allowed to copulate; this was at 7.30 in the evening, and by 10 p.m. the female was depositing ova freely.—T. B. Jefferys; Bath, (late) Langharne, Carmarthenshire, June 13th, 1895.

Deilephila livornica in Devonshire.—On June 2nd, about 8.30 p.m., my father, gathering verbena flowers in our garden near Plymouth, in Egg Buckland parish, took a fine specimen of this insect. It was so active that its thorax got somewhat badly rubbed. The locality is an inland one, being about four miles from the sea, and as I hear the species was taken a year or two ago on Dartmoor, it seems that it breeds around Plymouth.—F. J. Briggs; Exeter College, June 10th, 1895.

Collecting in North Staffordshire.—Lepidoptera appear to be out in great numbers in this county so far this season. I was collecting with my friend Mr. F. C. Woodforde, of Market Drayton, in some woods in North Staffordshire, from June 1st to 4th, when we took the following species, amongst others:—*Arygnnis euphrosyne, Chærocampa porcellus*, one at dusk; *Nola confusalis*, abundant; *Bombyx rubi*, flying freely at sunset, when we netted several specimens; *Drepana lacertinaria* and *D. falcataria*, both taken freely by beating; *Zonosoma punctaria, Z. pendularia,* and *Asthena luteata,* all fairly plentiful; *Z. porata* one; *E. heparata,* one; *Acidalia remutaria,* abundant; *Macaria notata,* plentiful; *Numeria pulveraria,* several taken; *Lobophora viretata,* one only taken; *Melanthia albicillata* and *Melanippe hastata,* several of both species; *Cidaria corylata,* very abundant. At sugar, to which moths came freely, the following:—*Thyatira batis, Cymatophora duplaris, Acronycta leporina, A. megacephala* and *A. alni,* one specimen only of the latter; *A. rumicis,* very abundant (including the dark variety *salicis*), and *A. psi; Leucania comma; Xylophasia rurea* var. *alopecurus,* very abundant; *Dipterygia scabriuscula, Apamea basilinea, A. gemina, Miana strigilis, Grammesia trigrammica,* and *Rusina tenebrosa,* very abundant; *Noctua plecta; Tæniocampa gothica,* one belated specimen turned up; *Aplecta prasina, Hadena adusta* and *H. porphyrea,* very abundant; *H. dentina, H. pisi, H. thalassina* and *H. genistæ;* one early *Triphæna pronuba; Euplexia lucipara,* abundant; *Phytometra ænea* and *Euclidia glyphica* were taken in the daytime. *Aplecta tincta* and *H. dissimilis* were added to the list by Mr. Woodforde a few nights later.—E. W. H. Blagg; Cheadle, Staffs., June 18th, 1895.

Nyssia lapponaria in Scotland.—Mrs. Cross has read with interest the report on *N. lapponaria* (*ante,* p. 163). In notes made here in 1874 she finds a little sketch of a caterpillar taken (as far as she can remember) on birch. Old Thomas Eedle, who used then to be constantly at Rannoch, told her he believed it was *N. lapponaria.* She failed in breeding it, as it shrivelled up and died in the pupa state. The larva by her sketch is very like *N. hispidaria,* which she has frequently got here, but shows a rather prominent point on one of the last segments. Eedle was not often wrong in his conjectures, though at the time Mrs. Cross could hardly believe she had found the scarce *N. lapponaria.* She is glad to hear of its existence in Scotland being confirmed by Mr. Christy.—Dalchosnie, Rannoch, June 19th.

The Earlier Dragonflies. — My first capture this season was *Pyrrhosoma minium,* Har., at the Black Pond, near Esher, on May 3rd, but the species did not appear in any considerable numbers till the end of the month; its congener *P. tenellum,* Vill., was flying with it on June 9th. A few specimens of *Libellula quadrimaculata,* Linn., were out at the same place on May 8th; the species swarmed there at the beginning of June, as well as over the Basingstoke Canal near Byfleet, and at Wisley Pond near Ripley. *Enallagma cyathigerum,* Charp., was first sighted at the Black Pond on May 8th; by June 4th it had increased in numbers and brilliancy of colouring. Not a single *Agrion puella,* Linn., has fallen a victim there so far this season, whereas at Wisley Pond, on June 3rd, but one *E. cyathigerum* was taken, *A. puella* having apparently taken its place in the latter locality. A very limp specimen of *Cordulia ænea,* Linn., was captured on May 26th at the Black Pond; it was out in profusion near Byfleet on June 3rd, and in smaller numbers at Wisley Pond on the same day, and at the Black Pond on the next. On June 3rd a friend and myself secured seven specimens of *Brachytron pratense,* Müll., some near Byfleet and others at Wisley Pond, while between the two places *Calopteryx splendens,* Har., might have been taken in large numbers. *Ischnura elegans* turned up on the same day at Wisley Pond, one being also secured at the Black Pond the next day. On June 2nd a fine male *Anax formosus,* Lind., was sighted at close quarters at the Black Pond; and on the dull afternoon of the 4th three females were seen on Esher Common, two of them being easily captured. By June 9th they were well out at the Pond, but so lively were they in the bright sunshine that one could only admire them at a distance. On the last-mentioned date a single specimen of *Platycnemis pennipes*, Pall., was secured at the Black Pond, this, with *I. elegans*, being additions to my list for that locality. Of *Platetrum depressum*, Linn., about half a dozen have been sighted, of which one was captured on June 2nd near Esher.—W. J. Lucas, B.A., St. Mary's, Knight's Park, Kingston-on-Thames, June 11th, 1895.

Orgyia gonostigma.—It may be worth recording the successful emergence of the *Orgyia gonostigma* which I recorded, *ante*, p. 182. My friend and I got eight females and four males out of twelve larvæ found; he subsequently took the females out to the place where the larvæ were found, and succeeded in attracting six males, mostly in fine condition. It is a curious fact that the female larvæ of this insect undergo an extra moult, instead of the same number as the male. I have found it to be the invariable rule with *O. antiqua*, and have noticed it in some cases with *Ocneria dispar*. It would be interesting to notice whether this rule holds good with other moths whose females are much larger than the males.—H. W. Shepheard-Walwyn; Hertford College, Oxford.

Sphinx ligustri two winters in Pupa.—On June 5th ult., in the afternoon, a fine specimen of *Sphinx ligustri* emerged, after being almost two years in the pupal condition, it having turned on the last day of August, 1893. The larva was procured at Bournemouth.—Douglas B. Gloyns; 36, Market Place, Kingston-on-Thames, June 6th, 1895.

Colias edusa, &c., in Middlesex.—I am glad to be able to report the reappearance of *Colias edusa* this year. On Saturday, June 9th, I was walking along the North-Western Railway bank, about half a mile from Pinner Station, when a female flew past me, going at a great rate. This was at the identical spot where I first saw the species in 1892. About an hour later I came across a second specimen, also a female, in Oxhey Wood, which at this particular point is just in Hertfordshire. All the other spring butterflies were very plentiful, *Lycæna icarus* swarming upon the trefoil in company with *Nisoniades tages* and several *Syrichthus malvæ*, while I also saw single specimens of *Arctia villica* and *Euchelia jacobææ*. In the hayfields *Procris statices, Halia tenebrata, Euclidia mi* and *E. glyphica* have also been unusually abundant.—H. Rowland Brown; Oxhey Grove, Harrow Weald, June 9th, 1895.

Colias edusa at Reading.—On June 3rd I saw a fine male *Colias edusa* flying in a clover-field near here.—W. E. Butler; Hayling House, Reading, June 15th, 1895.

Colias edusa in Wales.—When in Carmarthenshire on June 7th I noticed a female *C. edusa* depositing ova on the bird'sfoot trefoil (*Lotus corniculatus*).—T. B. Jefferys; 17, New King Street, Bath, June 13th.

Coccyx cosmophorana, &c., in Lancashire.—From June 1st my wife and I spent eight days at Grange on health account. I was lame, and could not remain over two hours on my legs; so my wife did most of the catching, and I manipulated the boxing. My special object was to study the habit of *Putalis fusco-ænea* and, if possible, to help my friend Mr. E. R. Bankes to a clue of what the larva will be found on. So far I have found the moth creeping up out of the moss at the roots of *Helianthemum* and nothing else. The place is bare of undergrowth. I got some scores of the perfect insect; some have laid eggs, which have been sent to Mr. Bankes along with some plants. My next look-out was for *Catoptria aspidiscana*, to pin them with silver pins for my friend Thurnall; I was quite two weeks late; nearly all worn specimens. Among a miscellaneous lot of species that I boxed are *Phoxopteryx siculana*, *Œcophora flavifrontella*, *Grapholitha obtusana*, *Coccyx vacciniana*, and one fine large *C. cosmophorana*, the latter a very interesting catch. *Ennychia octomaculalis* was jerking about. *Nemeobius lucina* and *Argynnis euphrosyne* were enjoying themselves in the gleams of sunshine. *Lycæna astrarche* var. *salmacis* was just out and in lovely condition. I took several species in the woods far away from their usual habitat, such as *Bactra lanceolana* on dry limestone. Altogether I brought home quite a thousand specimens.—J. B. Hodgkinson.

SOCIETIES.

Entomological Society of London. — *June 5th*, 1895. — Lord Walsingham, F.R.S., Vice-President, in the chair. Dr. Sharp exhibited, on behalf of Dr. G. D. Haviland, two species of *Calotermes* from Borneo, the individuals being alive and apparently in good health; one of the two small communities (which were contained in glass tubes) consisted of a few individuals of the immature sexual forms and of a neoteinic queen; this latter had increased somewhat in size during the eight months it had been in Dr. Haviland's possession, but no eggs had been deposited, neither had any of the immature individuals developed into winged forms. The second community exhibited consisted entirely of the immature sexual forms, and this community had produced numerous winged adults while it had been in Dr. Haviland's possession. Specimens were also exhibited to illustrate the neoteinic forms that were produced in Borneo after a community had been artificially orphaned. As regards these, Dr. Sharp expressed the hope that Dr. Haviland would shortly publish the very valuable observations he had made. In the case of a species of fungus Termite, Dr. Haviland had found that the community had replaced a king and queen by normal, not by neoteinic forms. Professor Riley remarked that in many cases it would be extremely difficult to artificially orphan a nest without destroying it; he also commented on the short time in which the queen appeared to have been developed, and on the apparently rapid development of the wing pads, which usually cannot take place except after several moults; and he expressed his opinion that further information on these points was much to be desired; he corroborated the observation of Dr. Haviland with regard to the great variability in the nests of different years (or even of the same year) of the number of queens, true or neoteinic; in one nest of *Eutermes morio* he found one-fourth of the inhabitants to be true kings and queens, although not fully developed. Mr. McLachlan exhibited examples of the female of *Pyrrhosoma minium*, Harris, having the abdomen incrusted with whitish mud through ovipositing in a ditch in which the water was nearly all dried up. He had noticed the same thing in other species of Agrionidæ. Herr Jacoby exhibited four varieties of *Smerinthus tiliæ*. Mr. Enock exhibited specimens of the thistle gall-fly, *Trypeta cardui*, and also of *Caraphractus cinctus*, Haliday (= *Polynema natans*, Lubbock); with regard to the latter insect, he said that he had observed copulation to take place below the surface of the water. A discussion followed on this point, in which several of the Fellows took part. Mons. Alfred Wailly exhibited living larvæ of *Rhodia fugax*, and also a cocoon of the species, which is of a bright green colour, and differs considerably in shape from those of all the other known silk-producing Bombyces. The Secretary exhibited, on behalf of Mr. T. D. A. Cockerell, of Las Cruces, New Mexico, four species of lac-producing Coccidæ, viz., *Tachardia gemmifera*, Ckll., from Jamaica; *T. pustulata*, n. s., and *T. fulgens*, n. s., from Arizona; and *T. cornuta*, Ckll., from New Mexico. In the discussion which followed, Lord Walsingham mentioned the fact that an American species of Micro-Lepidoptera, belonging to the Œcophoridæ, feeds on the secretion deposited by one of the Coccidæ; this species, for which Dr. Clemens created a genus (the name for which was found to have been preoccupied and now stands as *Euclemensia*), is the nearest ally to the lost *Œcophora woodiella*, taken many years ago in England. Mr. Roland Trimen exhibited some specimens of "honey" ants, discovered at Estcourt, in Natal, about a year ago, by Mr. J. M. Hutchinson. The species has not been identified, but is quite different from *Myrmecocystus* and *Camponotus*—the genera which have long been distinguished as containing species some of whose workers are employed as living honey-pots for the benefit of the community. The specimens exhibited included six "globulars"—to use Mr. McCook's term in regard to the American species *Myrmecocystus hortus-deorum*—all with the abdomen enormously distended with nectar; but other examples presented to the South-African Museum by Mr. Hutchinson comprised various individuals exhibiting different gradations of distention, thus indicating that the condition of absolute repletion is arrived at gradually, and may possibly be reached by some few only of those individuals who feed, or are fed up, for the purpose. Certainly, in the nests examined by Mr. Hutchinson, in Natal, the number of "globulars" was very small in proportion to the population of ordinary workers; and it is somewhat difficult to understand of what particular value as a food reserve so very small a quantity of nectar so exceptionally stored can be. Mr. Trimen added that while the occurrence of "honey" ants in southern North America, South Australia, and he believed also in India, was well known, the Natal species now exhibited was the first African one that had come under his notice. In the course of the discussion which followed, Professor Riley said that the American species referred to by Mr. Trimen was common from Colorado to Mexico, and that the honey-bearing ants were often very numerous in their communities; he further pointed out the fact that many common species of ants have the power of distending the abdomen with honey, and that this was very evident in certain species of *Formica*. Dr. Sharp exhibited a series of Coleoptera to illustrate variation in size. This series consisted of individuals that had been kindly lent to him by M. René Oberthür, by the Hon. Walter Rothschild, by Messrs. Godman and Salvin, by Mr. Jacoby, and by Mr.

Blandford. He considers this series, and the communications he has received from the specialists to whom he has made applications, justify him in saying that great variation in size of the individual or of some of its parts is very rare in Coleoptera, and is exhibited most conspicuously by those species in which the males possess unusual structures, the use of which is unknown; such are the Brenthidæ and the genus *Rhina*, the males of which possess enormous rostrums, which are of no direct use in this sex, though the corresponding organ in the other sex is of great use, though less developed. The Lucanidæ and the horned Lamellicornia also exhibit great variation in size of the individual, more particularly in the male sex. The cases of variation in size in the great group of Chrysomelidæ were chiefly remarkable in the case of genera like *Sagra*, where the males possess unusually developed hind legs, for which we at present know of no important use. Mr. Kirkaldy exhibited specimens of *Cymatia coleoptrata*, Fab., from Morden, Surrey, an insect which had not before been recorded from the London district, and also varieties of *Notonecta glauca*, Fab.—W. W. Fowler, *Hon. Sec.*

South London Entomological and Natural History Society.—*May* 23*rd*, 1895.—Mr. T. W. Hall, F.E.S., President, in the chair. Mr. Barrett, on behalf of Mr. Horne, of Aberdeen, exhibited very long series of both *Agrotis cursoria*, Bork., and *A. tritici*, L., from the N.E. coast of Scotland, showing such a range of variation that it was difficult to determine where one species ended and the other began; also a gynandrous specimen of *Saturnia carpini*, L., belonging to Dr. Mason, one side being male, the other female. Mr. Edwards, a specimen of the rare female of *Morpho cypris* from Bokota, with a male for comparison. Mr. Dennis, ova and young larvæ of *Leucophasia sinapis*, L., and of *Lycæna argiolus*, L., under the microscope. Mr. Hall, two specimens of the rare form of *Mamestra persicariæ*, L., known as var. *unicolor*, Staud., bred by a northern collector from a dark specimen derived from suburban larvæ; also several specimens of a *Eupithecia* from Mr. Machin's collection, which members thought were *E. minutata*, Gn., var. *knautiata*, Greg. Of several members who had larvæ of *Callimorpha hera*, L., most had been only very partially successful in getting them through the severe frost. A long discussion ensued as to the felling of trees in Epping Forest. The concensus of opinion was that no harm had been done, and that none was intended to be done. Mr. Carrington and others thought that a periodical cutting of the undergrowth would be of great advantage to entomologists, and instanced the method of cutting woods in Surrey and Kent.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*April* 22*nd*, 1895.—Mr. G. T. Bethune-Baker, President, in the chair. The following were exhibited:—By Mr. R. C. Bradley, three species of *Crabro: varius* and *anxius* from Wyre Forest, and one specimen of *pubescens* from Sutton; he said that only four other specimens of *pubescens* are known to Mr. Saunders from Britain. By Mr. A. H. Martineau, *Andrena angustior* (2) from Solihull, a rare species allied to *A. furcata*. By Mr. Wainwright, other Hymenoptera. By Mr. C. Runge, eggs of *Asphalia flavicornis*, as found, being laid singly in the forks of twigs. Mr.

Martineau read a paper on a collection made in his house at Solihull. He made the collection in consequence of a questioned statement that 100 species of insects enter a house in a year; he had taken 136 during the past year, and believed that if he had been able to collect more in the daytime it might have been made up to 200. The most unexpected captures were *Acidalia virgularia* and *Tinea semifulvella*, neither having been previously known locally. He noticed that *Culex annulatus* and *pipiens*, which were common in the cellars, only settled on the brickwork, never on plastered laths which covered part of the ceiling.

May 20*th*.—Mr. P. W. Abbott, Vice-President, in the chair. Exhibits:—By Mr. Abbott, a series of *Zygæna meliloti* from the New Forest, for comparison with some doubtful specimens of Mr. Wainwright's, which he believed to be only vars. of *Z. loniceræ;* also a pale specimen of *Agrotis ripæ*, bred, from Freshwater; and *A. ashworthii* from N. Wales, bred by Mr. Gregson. By Mr. R. C. Bradley, *Pompilus viaticus* from Wyre Forest, and remarked on the extraordinary activity of the family Pompilidæ, and the difficulty of capturing them. By Mr. Valentine Smith, a variety of *Rhagium bifasciatum* from Edgebaston, with the white colour much extended, making a white-looking specimen; also *Elater balteatus* (1) from Edgebaston, and three *Hister purpurascens* from New Street, in the centre of the city.

June 1*st to* 4*th*.—The fourth Annual Excursion was made to Cannock Chase, but, owing to the dulness of the weather and the very small attendance of members, nothing of importance was done, though a number of insects were secured.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

Abstract of Proceedings of the South London Entomological and Natural History Society for the year 1894, *together with the President's Address.* Pp. 136. May, 1895. Published at the Society's Rooms, Hibernia Chambers, London Bridge, S.E.

The earlier issue of this publication is an improvement upon which we heartily congratulate the Society from which it emanates, and whose useful work it records. The detailed reports of the meetings held during the year embrace many items of importance. Among the papers, of which there are quite a respectable number, Mr. Tutt's pleasantly written series of articles on Continental Zygænidæ deserve the attention of all interested in the group, but will hardly perhaps close the question of synonymy as regards the species discussed. These papers, together with the same writer's notes on Lepidoptera of the Alps, and papers by Mr. W. F. Warne ("A Morning's Sport near Rockhampton, Queensland, Australia") and Mr. Mansbridge ("The Rhopalocera of the Indian Territory in 1893-4") afford striking evidence of the interest taken by members of the Society in the fauna of countries other than their own. Mr. Adkin, in "Reflections upon odd Rambles on the Sussex Downs," makes some remarks on the resting habits of *Lycæna corydon*, and refers to some species which now seem to have disappeared from the neighbourhood of Eastbourne.

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VARIETY, FORM, RACE, AND ABERRATION.

By W. Mansbridge, F.E.S.

Considering the amount of uncertainty and looseness attending the use of the above terms, a definite expression of opinion coming from some acceptable authority, and which should set the matter at rest, would be eminently satisfactory to all working entomologists. Of course every collector has his own ideas of what constitutes a variety, but it is not probable that these would coincide with the opinions of another student of similar experience. This no doubt arises from the difficulty of dealing with a subject where no sharp differences exist to separate all departures from the particular form accepted as the type of a species. Some authors think the addition or suppression of a spot, or a slightly lighter or darker tint in the ground-colour, sufficient to characterise the specimen as a variety, and proceed to endow it with a name; other writers require a greater amount of divergence, but if asked how much they probably would be at a loss for a definite explanation. And again, most of us, looking upon Entomology as a recreation or pastime with which to charm our leisure, are predisposed to treat it in a somewhat haphazard and desultory fashion that is fatal to exact knowledge.

A perusal of the views of some of the leading American entomologists, published in 'Entomological News' (vol. vi. Nos. 1—4), confirms this opinion. One writer, Rev. Geo. Hulst, giving no less than seven names, *viz.*, subspecies, race, variety, subvariety, form, variation, aberration, all being included by the term variety. The accompanying definitions show a tendency to overlap, and the use of the word "form" is restricted to "seasonal or sexual variation somewhat permanent." The majority of the authors use this term in the same sense, Prof. Packard alone employing it as British entomologists do, in a general manner, practically synonymous with "variety."

"Variety" is consistently employed as a general term, and "aberration" designates an unusual and rarely occurring variety, erratic in its appearance, and with little or no tendency to transmit its peculiarities to offspring; although this point may not have been thoroughly investigated in America, as we know, from the results of pedigree-breeding, that this kind of variety can be produced in increasing numbers with every successive brood.

"Race" is used in its usual sense to designate a particular variety or form which is restricted to a particular and perhaps isolated locality, and which has been established, by breeding, to belong to a particular species.

Taking a general view of the opinions expressed, it is more than anything else a question of degree, with the single exception of the American specialized use of the word "form," which seems more properly used in its general sense; thus it should not be difficult to frame a more satisfactory set of definitions than have hitherto been advanced.

NOTES ON THE YELLOW AND OTHER VARIETIES OF *ZYGÆNA TRIFOLII.*

By W. M. Christy, F.E.S.

The following notes relate to a particular colony of *Z. trifolii* which I only discovered in 1893, although I had been living near it for years. In the year mentioned the species was excessively abundant, but small in size; I fear it will never be so plentiful again. I took about a hundred specimens of the yellow variety, all told. In 1894 the colony was very weak, and I only found two yellow specimens among them. This year (1895) the species was fairly numerous, and I was able to get sixteen yellow specimens. In 1893 I removed a lot of the red form to another spot where *Z. trifolii* did occur before, and in the following year I was rewarded by finding there two yellow specimens, which brought up my total for 1894 to four examples of the yellow variety.

Now, as to breeding the yellow variety: two of the specimens taken last year laid a lot of eggs, and from these I have raised over 200 moths. Not one of these is of the yellow form, but all are of the ordinary crimson-red colour. On the other hand, Mr. Fletcher, of Worthing, reared seven yellow examples, I believe, from eggs which I sent him in 1893.

There is no variation in the shade of colour of the yellow form; at least this is so with one exception. I have one yellow example which is tinged or shaded with pinkish.

In another variety which I have noticed in this colony the colour is orange-red or brick-red. This form, unlike the yellow one, does vary in the shade of colour: some of them are almost of the normal crimson-red, whilst others are very decidedly distinct in colour from the ordinary form.

Another variation is one that reminds me very much of *Zygæna pilosellæ?*—the Irish burnet. The red colour occupies the greater part of the fore wings, and the blotch is specially wide towards the hind margin, where it shades off imperceptibly into the green margin. The wing-rays appear greenish, running into the red blotch from the hind margin; this gives the red blotch an undefined and feathery edge. I have taken two of these at this colony, and another, years ago, at another place near by. This remarkable colony also produces a few specimens imperfectly provided with wings, some even without wings at all. I have one specimen which has one well-developed hind wing, but the other three wings are entirely absent. Another example bears two good wings on one side and a rather bleached and imperfect hind wing only on the other.

Most curious of all, perhaps, are specimens with their wings considerably shortened or cropped off, the hind or outer parts being left with deep wedge-shaped notches cut out of them.

Some bred specimens with dwarfed wings ought perhaps also to be mentioned; two of these have full-sized bodies, but the wings are only half their proper length. Yet these wings show all the spots clearly, but in miniature and rather crowded.

Watergate, Emsworth.

WHY NOT COLLECT TORTRICINA?

During the past twenty years or so there has certainly been some increase in the number of micro-lepidopterists, and the results have been the discovery of many new species, together with a considerable addition to our knowledge of the group as a whole; but much still remains to be done. For several species of Tortricina, for example, only a few British localities (sometimes only a single one) have been recorded; but most probably, if there were a greater number of collectors of this family, it would be found that such species were more widely distributed. The life-histories of certain species in the same family have yet to be made known, and the much-vexed question of species *versus* variety has yet to be decided in not a few cases.

There is no doubt that if collectors of British Lepidoptera were more generally interested in Tortricina than they appear to be, they would have fewer barren excursions than often falls to their lot. All the species are very interesting, and many are exceedingly pretty. They are easily collected, mostly by day, either as imagines or larvæ. In the latter stage they are, with a few exceptions, not difficult to rear, and the moths can be set with less trouble than many species of Macro-Lepidoptera. The task of identifying some of the more obscure species is sometimes rather perplexing perhaps, but certainly should not deter one from making a collection of Tortrices. The concise descriptions in the second volume of Stainton's 'Manual' are excellent, and should enable the beginner to determine the majority of his captures without any serious difficulty. In cases where he finds himself puzzled he may always rely on the help of those who are better acquainted with the group. He must, however, endeavour to work out the species for himself as far as possible, as the more practice he has in this kind of thing the more readily will he be able to determine his captures. A good plan to facilitate the work of identification would be to obtain types of all the more or less common species; but of course it would be necessary to have only specimens in fine condition, and equally of course there should be no doubt about these being correctly named.

Although the volume of Stainton referred to admirably serves as an introduction to the study of our Tortricina, it is unquestionable that a new work on the subject is much needed. A large amount of information concerning the family has been published during the past thirty or forty years; but this is to a large extent scattered through many volumes, and awaits collation by a specialist to render it of practical use to the student. Figures of the species would be desirable; but these, to be of any value for identification, need to be produced in the best possible manner, which of course would mean at considerable cost; consequently a good illustrated work would be beyond the means of most of those to whom such a work would be of the greatest service, even if anyone should feel disposed to incur the heavy expense of bringing it out.

RICHARD SOUTH.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

(Continued from p. 202.)

NOCTUA DAHLII, *Hb.*—Very widely spread but local, and occasionally very numerous. The pale ochreous brown form taken in England, much mottled and with distinctly marked band and strigæ, I have not seen in Ireland. A Scandinavian specimen, sent me as a type by Sven Lampa, of Stockholm, is of a very faded ochreous colour, much mottled and faintly banded. I have, however, met with a few mottled Irish examples, but with either a pale reddish fuscous, or a brownish red ground colour. In Ireland it is a distinctly darker insect than the generality of English specimens (as I understand it is also in Scotland); generally of a purplish red, with suffused median band, and the strigæ and orbicular stigma more or less obsolete, but the reniform clearly marked. It often very nearly approaches dark forms of *N. brunnea*. A rarer form also occurs, of a unicolorous dark sepia colour, the only marking being a very clear whitish reniform stigma, preceded by a darker blotch representing a vestige of the median band, and in some instances a pale dotted ante-marginal waved line. Some examples of this melanic variety are wholly unicolorous, while others show only a trace of the pale reniform, and others only with its outline represented. I propose to name this dark form var. *perfusca*. It is not scarce about Favour Royal, Tyrone; and I have met with it at Markree Castle, Sligo; and in Lord Crofton's demesne near Roscommon; and at Clonbrock, Co. Galway, where also occur very mottled specimens. Localities:—Howth and Killarney (*B.*); Buncrana; "common at Magilligan, and on the shores of L. Swilly" (*C.*); very dark forms at Carrablagh (*G. V. H.*), Co. Donegal; Lissadel and Markree, not scarce, Co. Sligo; Ardrahan, Co. Galway; Saltee I., off the Wexford coast.

Noctua rubi, *View.*—Plentiful where it occurs, but restricted in distribution. The red form (*quadratum*, Hb.) is said (*cf.* 'British Noctuæ,' Tutt) to be a seasonal dimorphism. I certainly have taken this variety alone at Farnham, Cavan, and elsewhere, and thought it to be a local race; but my notes are defective as to autumn and summer captures. Common at Belfast (*W.*); and Drumreaske, Co. Monaghan; Favour Royal, Co. Tyrone; Farnham, Cavan; Tempo, near Enniskillen (*Langham*). Scarce at Enniskillen (*Col. Partridge*) and Armagh (*J.*); common at Castle Bellingham, Co. Louth (*Thornhill*) and Howth; also occurs at Markree Castle, Sligo; Dalyston and Clonbrock, Co. Galway; and Kilcool, Co. Wicklow.

Noctua umbrosa, *Hb.*—Widely distributed and pretty common.

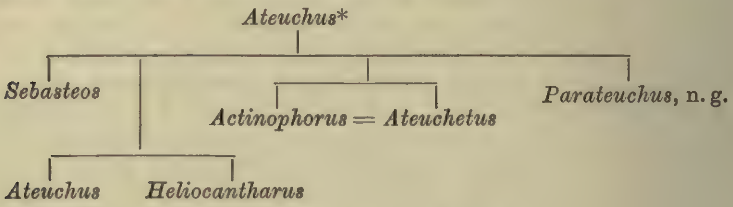
Noctua baia.—Very generally distributed, and occurring in more or less abundance in most localities, but scarcer than *umbrosa*. The colour varies somewhat, from a rich ferruginous brown to a greyer tone.

(To be continued.)

A REVISED CLASSIFICATION OF THE GENUS *ATEUCHUS*, WEBER.

By John W. Shipp.

In my list of species belonging to the genus *Ateuchus* I refrained from using the various subgenera, as the different authors did not characterize their genera sufficiently; and the whole of the subgenera were in a state of confusion, so that they could not easily be arranged. I have since, however, been able to rearrange and modify these characters so that the several groups may be easily determined as follows:—



I. Clypeus furnished with two or three deflexed teeth on the under side; anterior portions of the lateral margins of thorax sinuated; apex of anterior tibiæ curved inwards, 4-dentate on outside edge; a medial tooth on inner edge, two teeth on longitudinal carina on the upper side. Head produced in front . . . . *Sebasteos*, Westw.

II. Clypeus simple on the under side; anterior portion of lateral margins of thorax hardly if at all sinuated; anterior tibiæ 4-dentate, not curved at apex, simple on upper side. Head not so produced in front.

A. Sides of elytra parallel or subparallel; abdomen not cordiform; extreme apices of the four posterior tibiæ produced into a long inarticulate spur, and not truncated.

i. Elytra parallel-sided; pygidium invariably twice as broad as long; lateral margins of thorax produced into an obtuse point towards the centre nearer the posterior angles; inner margin of anterior tibiæ slightly sinuated, without teeth . . *Ateuchus*, Weber.

ii. Elytra subparallel; lateral margins of thorax rounded, not produced to an obtuse point near centre; inner margin of anterior tibiæ sinuated, and with two small teeth in centre . . . . *Heliocantharus*, McLeay.

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* See 'Entomologist,' xxviii. p. 40.

B. Elytra attenuated towards apex; intermediate tibiæ furnished with an articulated spur at apex; the four posterior tibiæ are truncated at apex; body more or less cordiform; lateral margins of elytra with a strong reflexed longitudinal carina or ridge.
  i. Abdomen strongly cordate, with the apex obtuse, greatly attenuated towards apex, more convex; thorax more convex, transversely compressed, giving it a more truncated appearance in front; head not perceptibly elongated . . . *Actinophorus*, Creutz.
  ii. Abdomen very slightly cordate, very slightly if at all convex; thorax simple, slightly convex; head perceptibly elongated in front; anterior tibiæ very much elongated, straight, 4-dentate; hind tarsi verticillated; body flattened; legs very hairy . *Parateuchus*, Shipp.

SEBASTEOS, *Westw.*
Trans. Ent. Soc. iv. 1842, p. 2.

Head distinctly elongated, free, and dilated at sides; clypeus with three deflexed teeth on the under side, one at the apex of the central indentation on the under side, and one at each of the apices of the two centre teeth; fore tibiæ with a centre spur on the inner margin, curved inwards at apex; four hind tibiæ slightly truncated, with a long curved spur springing from the inner margin; a very large and deep cicatrice on each side of the lateral margins of the thorax, just above the centres; the anterior angles terminated in two small obtuse teeth; hind tarsi pyriform, jointed; apical margin of the mentum curved, not sinuated as in *Ateuchus.*

galenus, Westw. (type), Trans. Ent. Soc. iv. 1842, p. 2, pl. xvii. f. 1 and det.; Shipp, Ent. xxvii. p. 291, 1894 (synonymy).
  Central Africa.
poggei, Waterh., Ann. Nat. Hist. (6), v. p. 367 (1890).
  Congo.
rostratus, Pering., Tr. Sth. Afr. Phil. Soc. iv. p. 92.
  South Africa.
westwoodi, Har., Col. Hefte v. (1869), p. 95.
  South-west Africa.

Prof. Westwood described this genus in 1842 with *galenus* (a new species) as his type. Bohemann (Ins. Caffr. ii. 1857) uses the name to denote *rusticus, funebris, cicicatricosus* (*bohemanni*, Har.); whilst *paradoxus* (*galenus*, Westw.) is placed by him in a subgenus *Actinophorus.* Erichson, evidently not comprehending the generic characters, places *intricatus, morbillosus,* and *laicus* as belonging to it.

I believe that *poggei*, Waterh., is identical with *S. westwoodi*, Har.

ATEUCHUS, *Weber*.

Obs. Ent. p. 10 (1807).

=*Scarabœus*, Linn., Har., Panz., Muls., &c.

Abdomen with the sides of the body parallel, not at all contracted behind, but shortly truncated; lateral sides of thorax produced to an obtuse point in the middle nearer the posterior angles. Thorax not very convex, but slightly rounded towards disc. Head with two lateral carinæ extending from the inner margin of the eyes towards the clypeus; four hind tibiæ long and slightly sinuate, not distinctly truncate; tibial spur longer than the three basal joints of tarsi in the four posterior tibiæ; sutural ridges distinctly visible. Head not perceptibly elongated. The four posterior tibiæ are produced into a long *inarticulated* spur; the apical spur on anterior tibiæ is very short and almost obsolete.

*ægyptiorum** (p. type), Latr., Voy. Cailliaud, iv. p. 279, t. 58, f. 10 (1827).
sanctus, Fb., Ent. Syst. Suppl. p. 34; Syst. El. i. p. 56.
erichsoni, Har., Col. Hefte ii. p. 94 (1867).
cribricollis, Waterh., Proc. Zool. Soc. (1885), p. 231, pl. xv. f. i.
venerabilis, Har., Col. Hefte viii. p. 2.

HELIOCANTHARUS, *McLeay*.

Horæ Ent. ii. p. 497.

Head not so produced; clypeus 6-dentate. Body with the sides subparallel, wider across the centre, truncate at apex. Thorax rounded at the lateral margins; posterior angles rounded, almost obsolete; posterior margin produced to an obtuse point at the suture; anterior angles rounded; apex of the pygidium bent underneath; the abdomen not truncated; sutural ridges distinct; hind tibiæ not spined or toothed.

sacer (type), Linn., Syst. Nat. i. pt. 2, p. 545.
pius, Illiger, Mag. ii. p. 202.

ACTINOPHORUS, *Creutz*.

Ent. Vers. (1799), p. 79.

Ateuchetus, Bedel, L'Abeille.

Four posterior tibiæ truncated at tips, the posterior pair having a single spur; intermediate tibiæ with a single inarticulated spur; hind tibiæ produced into an inarticulated spur, and the extremities distinctly but obliquely truncated. Sides of abdomen attenuated towards the apex; sides of thorax rounded, not produced into a point in the centre; hind tibiæ comparatively short, not sinuated. Apical spurs of the four posterior tibiæ short, barely exceeding in length the fourth or basal joint of the tarsi; femora produced into a dilated tooth in the centre in the males of some species. No visible sutural ridges. Head not distinctly elongated.

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* For synonymy see Entom. xxvii. p. 289–93.

puncticollis (type), Latr., Mem. Mus. Hist. Nat. v. p. 7, t. 18.
laticollis, Linn., Syst. Nat. 2, p. 549, 38.
variolosus, Fb., Mant. Ins. i. p. 16.
semipunctatus, Fb., Ent. Syst. i. 63, 207.

PARATEUCHUS, g. nov.

Body flatter than any of the preceding, hardly convex, flat on disc. Thorax wider than abdomen; sides subparallel, rather narrower towards apex. Pygidium small, curving inwards at apex. Clypeus produced in front, 6-dentate; teeth regular and pointed. Lateral margins of thorax rounded; posterior margin rounded. Prosternal keel produced to an obtuse point. Anterior tibiæ long, slightly curving inwards at tips; teeth regular and similar; terminal spine rather short and sharp. Hind legs long and slender; tarsi very elongated.

morbillosus (type), Fabr., Ent. Syst. i. p. 63; Syst. El. i. p. 56.
Guinea; Gambia.

ONTHOPHAGUS: CORRECTION IN NOMENCLATURE.

By John W. Shipp.

ONTHOPHAGUS, *Latr.*

Biplagiatus, Thomson, Archives, Entom. xi. p. 54, 1858.
Peringueyi, Shipp.
=*biplagiatus*, Peringuey, Trans. S. Afr. Phil. Soc. iv. pt. 11, p. 99, 1886.

Peringueyi, Shipp (*biplagiatus*, Peringuey, nec Thomson).

Head broader than long, punctured, with a short transverse ridge in the centre, and another on the clypeus, a little more raised than the first, and reaching nearly from one eye to the other; clypeus produced in front, with well-defined recurved margin, rounded apically and with a small indent in the centre, deeply punctured, and with the head shortly pubescent. Prothorax retuse anteriorly, broader than long, deeply punctured on the anterior part only, shining black, marginated with a moderately deep fovea on each side, convex posteriorly, and with a somewhat deep excavation in the middle of the anterior part, with the upper sides of the excavation produced in a short smooth acute protuberance. Elytra once and a half as long as the prothorax and contiguous to its base, with the sides very little ampliated, moderately depressed, finely striated, with the striæ punctured; shining black, with a slightly sinuated posteriorly basal yellow patch on each elytron, reaching from the 1st stria to the 4th, and extending to the median part of the elytra. Pygidium triangular and very convex, and deeply punctured. Under side black, shining; legs somewhat reddish; tarsi fuscous. Long. corp. 9 mm., lat. 4½ mm.

Hab. Beaufort, West, Cape Colony.

Biplagiatus, Thoms.

Head and thorax brilliant green bronze. Elytra of a yellowish testaceous, with a large common lateral black spot. Ventral surface and tarsi of a very brilliant dark brown bronze. Head rounded and raised on the anterior extremity, rather thickly punctured. Two blackish parallel carina are situated on the anterior extremity, between the eyes. Prothorax pubescent, very strongly punctured, feebler on the disc. Elytra pubescent, regularly striated. Long. corp. 5 mm., lat. 3 mm.

Hab. Gabon, Afr.

Oxford, 1895.

NOTES ON THE SYNONYMY OF NOCTUID MOTHS.

By Arthur G. Butler, Ph.D., F.L.S., &c.

(Continued from p. 125.)

Remigia megas.

Remigia megas, Guenée, Noct. 3, p. 317, n. 1776 (1852).
R. marcida, Guenée, *l. c.*, n. 1777 (1852).
Phurys perlata, Walker, Lep. Het. xiv. p. 1489, n. 3 (1857).
Remigia remanens, Walker, *l. c.*, p. 1498, n. 8 (1857).
R. hexastylus, Harvey (see Grote's Check-List, p. 41, n. 1277).

North America to West Indies. In Coll. B. M.

Cænurgia, *Walk.*

Litosea, Grote.

Cænurgia convalescens.

Drasteria convalescens, Guenée, Noct. 3, p. 289, n. 1734, pl. 22, fig. 9 (1852).
Cænurgia socors, Walker, Lep. Het. xiv. p. 1492, n. 1 (1857).
C. purgata, Walker, *l. c.*, n. 2 (1857).

New York, E. Florida, and Canada. In Coll. B. M.

Cænurgia togataria.

Anaitis ? togataria, Walker, Lep. Het. xxv. p. 1445, n. 12 (1862).
Litosea adversa, Grote (see Check-List, p. 39, n. 1108).

Mexico and California. Types in Coll. B. M.

Euclidia runica, Felder, belongs to this genus, and I am inclined to think that *Euclidia intercalaria*, Grote (of which, however, I only know the female), should also be placed here.

Siavana, *Walk.*

Harveya, Grote.

Siavana repanda.

Siavana repanda, Walker, Lep. Het. xiii. p. 1009, n. 1 (1857).
Harveya auripennis, Grote (see Check-List, p. 41, n. 1269).
United States. In Coll. B. M.

It is extraordinary that Grote and Robinson could have gone carefully through the Museum collection without noticing our seven examples of this very conspicuous species.

Panopoda, *Guen.*

The named forms of this genus are much confused. The *P. rubricosta* of Guenée is a variety of *P. rufimargo*, in which the lower part of the reniform marking of primaries is filled in with black ("in the form of a tear," Guenée says).

P. roseicosta is a combination, the male being evidently an ochreous variety of the form generally recognized as *P. carneicosta*, whereas the female is *P. rufimargo*; the name *P. roseicosta* will, therefore, supersede that of *P. carneicosta*. There can be no doubt on the point, for Guenée distinctly says that the reniform spot is like a 2, and (by implication) describes it as black; whereas the reniform spot of *P. carneicosta* is said to be in the form of an L, and is a variety of the other.

P. cressonii, Grote, Proc. Ent. Soc. Phil. 1863, vol. i. p. 346, pl. 3, fig. 4, is a grey variety of *P. rufimargo*, but I do not see it at p. 41 of the Check-List for 1882.

In my opinion the whole of the named forms are sports of *P. rufimargo*.

As synonyms of the above varieties, the following, described by Walker, may be noted:—*Ophiusa combinata*, Walk. (Lep. Het. xiv. p. 1436, n. 37), = *P. carneicosta* and *Poaphila scissa*, Walk. (Lep. Het. Suppl. 3, p. 987), = *P. roseicosta* (grey variety).

The varieties of this species may therefore be tabulated as follows:—

a. Reniform spot pale yellow.
    1. Wings above ochreous. - - - - - *P. rufimargo.*
    2. „ „ grey. - - - - - - - *P. cressonii.*
b. Reniform spot with lower half black.
    1. Wings above ochreous. - - - - - *P. rubricosta.*
c. Reniform spot black.
    1. Reniform spot L-shaped; wings grey. - - - - - - - - - - *P. carneicosta.*
    2. Reniform spot 2-shaped; wings ochreous. - - - - - - - - - - *P. roseicosta.*
    3. Reniform spot 2-shaped; wings grey. - - - - - - - - - - - - *P. scissa*

The above differences are practically all the distinctive characters between these sports, the form of the transverse lines being variable.

EPIDROMIA, *Guen.*

Epidromia pannosa.

Epidromia pannosa, Guenée, Noct. 3, p. 326, n. 1791 (1852).
Remigia saturatior, Walker, Lep. Het. xiv. p. 1502, n. 12 (1857).

Brazil. In Coll. B. M.

Epidromia valida.

Ophisma valida, Walker, Lep. Het. Suppl. 3, p. 953 (1865).

St. Domingo. In Coll. B. M.

Epidromia zetophora.

Epidromia zetophora, Guenée, Noct. 3, p. 326, n. 1792, pl. 23, fig. 5 (1852).
Ophisma ? antica, Walker, Lep. Het. Suppl. 3, p. 954 (1865).

Venezuela. In Coll. B. M.

M. Guenée's figure of this species is very bad; more like a *Thermesia* than an *Epidromia* in form.

ORTHOGRAMMA, *Guen.*

Orthogramma coppeyi.

♂ *Orthogramma coppeyi*, Guenée, Noct. 3, p. 348, n. 1816 (1852).
Epitausa lætabilis, Walker, Lep. Het. x. p. 477, n. 1 (1856).
♀ *Thermesia ? icterodes*, Felder, Reise der Nov. Lep. 4, pl. cxviii. fig. 7.

St. Domingo. In Coll. B. M.

Orthogramma guttularis.

♀ *Thermesia guttularis*, Walker, Lep. Het. Suppl. 3, p. 1049 (1865).
Azeta apicifera, Walker, *l. c.*, p. 1065 (1865).
♂ *Archana certa*, Walker, *l. c.*, p. 1098 (1865).

Ega, Santarem, Pará, Espiritu Sancto. In Coll. B. M.

ARGIDIA, *Guen.*

Argidia tomyris.

Phalæna tomyris, Cramer, Pap. Exot. 3, p. 123, pl. 262, F, G (1782).
Argidia hyperythra, Guenée, Noct. 3, p. 346, n. 1813 (1852).

Surinam and Cayenne.

There cannot be a question about the identity of these supposed species; even Guenée is obliged to admit that his

A. hyperythra "only differs in the two black patches on the lower wings, if the figure of Cramer is exact," as if it were not patent to anyone who examines Cramer's figures, that they are little more than rough maps of the species which they represent; besides, the absence or presence of black patches (even if they were not grease spots) would not constitute Cramer's insect a distinct species, but only a different individual.

Hypenaria subvelata, Walker, and the allied *Argidia aganippe*, Felder, come near to *A. tomyris*, but are altogether greyer above and yellower below; both are represented in the Museum collection by female examples. On the upper surface the resemblance of *A. aganippe* to *subvelata* is considerable, but the under surface separates them at once.

Argidia tarchon.

♀ *Phalæna tarchon*, Cramer, Pap. Exot. 2, p. 65, pl. 139, c (1779).

Azirista intracta, Walker, Lep. Het. xv. p. 1639, n. 1 (1858).

♂ *Argidia subrubra*, Felder, Reise der Nov. Lep. 4, pl. cxviii. fig. 28.

Santarem and Rio Purus. In B. M.

I believe it is this species which Cramer re-figures as *P. wedelina* (pl. 397, M.); it is certainly not the species represented by Felder, which is a badly coloured, though well drawn, figure of *A. subvelata*, Walk.

Argidia suffusa.

Thermesia suffusa, Walker, Lep. Het. xv. p. 1561, n. 2 (1858).

T. tinctifera, Walker, *l. c.*, p. 1570, n. 18 (1858).

St. Domingo and Honduras. Types in Coll. B. M.

AZAZIA, *Walk.*

This genus differs from *Thermesia* in the shorter third joint of the palpi.

Azazia rubricans.

Ophiusa rubricans, Boisduval, Faune Ent. Madag. p. 106, n. 11, pl. 16, fig. 1 (1833).

Thermesia transducta, Walker, Lep. Het. Suppl. 3, p. 1058 (1865).

Asia, Africa, and Pacific Islands. In Coll. B. M.

THERMESIA, *Hübn.*

Thermesia gemmatalis.

Thermesia gemmatalis, Hübner, Exot. Schmett. Zutr. figs. 153, 154.

T. monstratura, Walker, Lep. Het. xv. p. 1564, n. 7 (1858).

T. costalis, Walker, *l. c.*, p. 1570, n. 17 (1858).

Hypernaria (sic) *detrahens*, Walker, *l. c.*, p. 1622, n. 21 (1858).
Plaxia subducta, Walker, *l. c.*, p. 1624, n. 1 (1858).
P. spiloleuca, Walker, *l. c.*, n. 2 (1858).
Remigia subsignata, Walker, *l. c.*, p. 1846 (1858).
Thermesia acutilinea, Walker, *l. c.*, Suppl. 3, p. 1045 (1865).
Hypernaria (sic) *anisospila*, Walker, Char. Undescr. Lep. p. 58, n. 96 (1869).

New World generally. In Coll. B. M.

We have an immense series of this very variable species, so that there is no doubt whatever as to the identity of the named sports recorded in the above synonymy. The genus *Thermesia* appears to be a small one, members of at least half a dozen genera having hitherto been wrongly referred to it.

Epistis, *Hübner*.

Hypenaria, Guenée.

This genus is actually nearly allied to *Thermesia*, but differs in having a little tuft or fringe on the upper surface at the distal extremity of the third palpal joint, which gives it an obliquely truncated or sometimes a notched appearance; the antennæ of the males also are pectinated and ciliated. Owing to the slender character of the abdomen in the females, several of them have been described as males.

Apistis fellearis.

♀ *Apistis fellearis*, Hübner, Exot. Schmett. Zutr. figs. 379, 380.
Hypernaria (sic) *metastigma*, Walker, Lep. Het. xv. p. 1621, n. 19 (1858).
Hypenaria mucescens, Felder, Reise der Nov. Lep. 4, pl. cxix. fig. 31.

♂ Trinidad, ♀ Venezuela. In Coll. B. M.

Apistis guttiluna.

♂ *Ctypansa guttiluna*, Walker, Lep. Het. Suppl. 3, p. 1078 (1865).
♀ *Hypernaria* (sic) *basigera* ♂, Walker, *l. c.*, p. 1080 (1865).

Santarem. Types in Coll. B. M.

Apistis exponens.

♂ *Hypernaria* (sic) *exponens*, Walker, Lep. Het. xv. p. 1621, n. 18 (1858).
♀ *H. hilaris* ♂, Walker, *l. c.*, Suppl. 3, p. 1083 (1865).
♂ *Hypenaria triocellata*, Butler, Trans. Ent. Soc. 1879, p. 74, n. 139.

Pará, Ega, and Rio Jutahi. Types in Coll. B. M.

Apistis eulalia.

♂ *Phalæna eulalia*, Stoll, Suppl. Cramer, pl. xii. fig. 2.
♀ *Hypernaria* (sic) *tenebrifica* ♂, Walker, Lep. Het. Suppl. 3, p. 1084 (1865).
♂ *H. basisignata*, Walker, Char. Undescr. Lep. p. 57, n. 95 (1869).

Espiritu Sancto and Pará. In Coll. B. M.

Apistis chermesipila.

♂ *Hypenaria chermesipila*, Guenée, Noct. 3, p. 383, n. 1874 (1852).
♀ *Hypernaria* (sic) *concordans*, Walker, Lep. Het. xv. p. 1619, n. 15 (1858).

Venezuela. In Coll. B. M.

Apistis binocula.

♀ *Hypænaria binocula*, Guenée, Noct. 3, p. 384, n. 1877 (1852).
♀ *Hypernaria* (sic) *rubripalpis* ♂, Walker, Lep. Het. Suppl. 3, p. 1080 (1865).
♀ *H. rudis* ♂, Walker, *l. c.*, p. 1081 (1865).

Ega and Santarem. In Coll. B. M.

It will be seen in the above synonymy of this genus, Walker invariably mistook females for males, the different structure of the frenulum in the sexes being evidently unknown to him.

Apistis angusta.

♂ *Phalæna angusta*, Cramer, Pap. Exot. 4, pl. 397, fig. F (1782).
♀ *Hypernaria* (sic) *unanimis*, Walker, Lep. Het. xv. p. 1613, n. 1 (1858).

Mexico. In Coll. B. M.

THIONA, *Guen.*

Thiona ? obliterans.

Plaxia obliterans, Walker, Lep. Het. xv. p. 1627, n. 6 (1858).
Thermesia ignilinea, Walker, *l. c.*, Suppl. 3, p. 1046 (1865).

Ega and Rio Negro. Types in Coll. B. M.

Plaxia atriplaga of Walker appears to be a *Thermesia*. It differs slightly from *T. gemmatalis* in the form of its primaries, but otherwise I have not discovered any structural difference, whilst the pattern is very similar.

(To be continued.)

NOTES AND OBSERVATIONS.

Tenacity of Life in Insects.—Your correspondent Mr. Harcourt Bath's note on decapitated dragonflies (*ante*, p. 204) reminds me that after the loss of a head or still greater injury some insects will not only retain their vitality for a considerable time, but will even perform functions. In 1828 Messrs. Kirby and Spence wrote :—"Yet a crane-fly (*Tipula*) will leave half its legs in the hands of an unlucky boy who has endeavoured to catch it, and will fly here and there with as much agility and unconcern as if nothing had happened to it [they might have added that the disunited legs themselves would exhibit movements for an appreciable time]; and an insect impaled upon a pin will often devour its prey with as much avidity as when at liberty. Were a giant eviscerated, his body divided in the middle, or his head cut off, it would be all over with him; he would move no more; he would be dead to the calls of hunger; or the emotions of fear, anger, or love. Not so our insects. I have seen the common cockchafer walk about with apparent indifference after some bird had nearly emptied its body of its viscera; a humble-bee will eat honey with greediness though deprived of its abdomen; and I myself saw an ant, which had been brought out of the nest by its comrades, walk when deprived of its head. The head of a wasp will attempt to bite after it is separated from the rest of the body; and the abdomen under similar circumstances, if the fingers be moved to it, will attempt to sting. And what is more extraordinary, the headless trunk of a male *Mantis* has been known to unite itself to the other sex. These facts, out of hundreds that might be adduced," &c., &c. Corroborating the last statement, though the mutilation was in all probability subsequent to the act, I have myself recorded ('Weekly Intell.' 1862, p. 180) the fact that the living abdomen (writhing) and hind wings (flapping) of *Tapinostola bondii* (female) were seen *in copulâ* with a male of that species by my friends McLachlan and J. W. Downing, and also by myself. The Rev. Mr. Bird long ago, in the 'Entomological Magazine,' wrote thus :—"When I was young in Entomology, I wished anxiously to find the quickest mode of killing an insect. Having captured a pretty beetle (*Malachius æneus*) it struck me that by cutting it in two at the junction of the thorax and abdomen I should kill it in a moment. I took a pair of scissors and divided it; the parts fell on a piece of white paper which lay before me. Far from being dead in an instant, I was grieved and surprised to see the head, with the fore legs attached to it, begin to run about the paper. It occasionally stumbled, but rose again, and exhibited, if I may so speak, perfect self-possession. It made for the edge of the paper, but, arriving there and looking over it, seemed to think it too precipitous, and so coasted along in quest of an easier descent, which nevertheless it did not seem able to find. This coasting and searching for a convenient place of descent, suited to its curtailed condition with respect to legs, of which it appeared perfectly aware, occupied the head incessantly. I regarded it with astonishment. Here then, I said to myself as I watched its motions, here lies the vitality of the insect; the body at any rate is dead. But in this I was quickly undeceived, for in about a minute after the body had fallen upon the paper I saw the hind legs brought upward, and employed in deliberately brushing and cleaning the wing-cases, exactly as a house-fly may be seen to clean its wings on a window-pane. The legs were then withdrawn, and the cases raised up, the true wings expanded from beneath, and all made ready for flight, which indeed I expected to see; but, the body seeming then to become aware that there was no guide, the head, its former companion, being in possession of the eyes, the design was abandoned, the wings folded up in their usual beautiful manner, and the attitude of rest again resumed. This whole process was repeated with perfect regularity at intervals of about a minute, if I rightly remember. A more perfect act of a sentient creature could not be exhibited. The head continued to run about, and the body to clean and expand its wings, the one for about twelve, the other for sixteen hours." . . . This grim curiosity is endorsed and quoted by Professor Westwood in his 'Text-book' (1838). I have a vivid recollection of an unusually fine female *Aglossa pinguinalis*, which had been long enough on the saddle to have its wings, thorax, and thoracic end of abdomen sufficiently set (and presumably dead) to have been placed in the cabinet, but which nevertheless showed unmistakable signs of vitality about the ovipositor end, from which eggs were still being protruded. And this opens up another question, the discussion of which may be deferred to a future opportunity.—H. GUARD KNAGGS; London, N.W., June 29th, 1895.

"JUMPING BEANS."—It seems that there is no need to go to South Africa for a "jumping bean." The cocoon of one of our own ichneumon-flies will jump very respectably, for a time at any rate. The ichneumon that I mean is one that infests *Tæniocampa gracilis*. Having killed its host it makes an egg-shaped or rather a perfectly oval cocoon, soft and white at first, but becoming hard and brown afterwards, and about three-sixteenths of an inch long. If these are put upon a hard surface they will jump nearly one inch in height. A dozen or so of them put into a chip pill-box will keep up quite a lively rattle, but they seem to get tired after an hour or two of this exercise. In a state of nature they cannot possibly indulge in any athletics because the cocoon is fastened by silken web or threads to a leaf or some other handy substance.—W. M. CHRISTY; Watergate, Emsworth, Hants, July 6th. [See also p. 82.—ED.]

COLOUR-CHANGES IN PLUSIA CHRYSITIS. — Referring to Mr. C. N. Bunn's remarks *re* "change of colour in *Plusia chrysitis*" (*ante*, p. 204) and mine (*ante*, p. 159), I have taken many examples this season, some showing the green-bronze, others the gold-bronze; but I am still inclined to think that the gold-bronze is the *emerging* colour, and the green-bronze due to exposure, though, as I have previously stated, I only bred a few, and all were gold-bronze; still I think if a number are bred they will show the same result. I can neither get ova nor larvæ here so far, or I would try the result. Though practically fresh, the green-bronze specimens that I have taken this season appear not so fresh as the gold-bronze specimens. — W. B. THORNHILL; Castle Cosey, Castle Bellingham, Ireland, July 1st, 1895.

LARVÆ OF ACRONYCTA PSI IN JUNE.—Is not June an unusual month in which to find larvæ of *Acronycta psi?* On June 26th last I took one on lime (*Tilia europæa*) in my garden, and another on the 29th following. The former spun a cocoon on the surface of the earth on the 1st of the present month, but was unfortunately "stung," and an ichneumon pupa is the only result. The second larva is still feeding, and appears to be perfectly healthy. It is, I should say, nearly full-grown. If this is, as I think, an unusual occurrence, I should like to know if any other reader of the 'Entomologist' has had a similar experience. I have, of course, frequently had larvæ of this species stung before, but this has never appreciably delayed pupation, and I do not think that this can be the cause in the present instance; but I am anxious to see if the living larva is "stung" or not. — A. E. Allworthy; 5, Gladsmuir Road, Whitehall Park, N., July 7th, 1895.

Polyporus for staging minute Insects.—This seems an excellent material for the purpose; it is not expensive, retains its white appearance, and is easily perforated by the finest pin. When it becomes more generally known there is no doubt this fungus will be adopted in preference to artichoke-pith or any other substance used before its introduction for staging insects. My samples were received from Messrs. Watkins and Doncaster of the Strand. — Richard South; Macclesfield.

Newspaper Entomology.—The following, which appeared in the 'Pall Mall Gazette' of May 27th, is another good example of newspaper entomology. The "omnivorous" collector may be interested to learn that the "large coppers" and "large tortoiseshells" are not extinct (especially the latter), and that the latter also has recently changed its habits, and has taken to hybernating under ground in the larval stage instead of feeding up in the early spring and summer:— "Sir,—In your issue of to-night is a letter assuring lovers of butterflies that the large tortoiseshell and large copper are not extinct, but unwisely naming a locality where one of the two species is abundant. That these rarities are still to be found every one rejoices, but their existence is doomed if facilities are given to the omnivorous collector to exterminate them with insatiable hand. At one of the principal post-offices one of the employees showed me about a dozen large tortoiseshells the other day that he had bred from the chrysalis, and was not ashamed to tell me that he had dug up about eight hundred larvæ of the same rare insect in the New Forest last autumn. Surely butterflies of rare occurrence should be protected as much as birds, and two or three specimens should be the limit allowed to any collector at the same time. It has always been a matter of regret to me that the writers of the best books on butterflies and moths should have boasted in their books of enormous captures of particular species in some locality or other; no one requires more than two or three specimens, and the example to young collectors is surely of the very worst type.—I am, Sir, yours, &c., A Moderate Collector." — Russell E. James; 3, Mount View Road, Finsbury Park, N., London, June 26th, 1895.

Dr. Wheeler's Sale, &c.—On the 10th of July the first portion of Dr. Wheeler's collection was sold at Stevens's, and again very low prices have to be recorded. On the whole the collection was disappointing. True there were, as one would naturally expect, some fine things, especially amongst the fen insects; but the condition all round was lamentably defective. In the first instance many specimens showed signs of rough usage, possibly at the time of collection; and secondly, the collection itself had for some years been dreadfully neglected, mites, grease, and mould having been allowed to accumulate to a deplorable extent. These facts coupled with the time of year will fully account for the prices realised. Two specimens of *Pieris daplidice*, both taken at Newmarket in August, 1872—the *daplidice* and *antiopa* year—realised 16/– each. A fine variety of *Argynnis aglaia*, figured in Barrett, and in which the marginal spots on all four wings had developed into streaked markings, taken at Hickling Broad in 1871, fetched £2 10s. Eight *Vanessa antiopa*, mostly taken in the fen district in 1872, made an average of 8/– each. There were only four *Chrysophanus dispar*, all more or less imperfect; a male realised 21/–, a female £3 10s., and two males set to show the under surface £2 15s. the pair. Lot 34 contained six *Lycæna acis* from Evan John, of Llantresant, and were cheap at £2; whilst Lot 35, containing a like number, some with a history and some without, went for 25/–. *L. arion* is evidently going up in price instead of receding, as one might expect from the number of specimens so recently captured in the South. Two lots of eight and nine fetched £2 2s. and £2. The Sesiidæ were a poor lot. Three Rannoch *Sesia scoliiformis* (1892) fetched 26/–; two single specimens of the same species, with other things, 10/– and 9/– each. *Lithosia caniola*, very moderate examples, fetched about 2/– each. There were seventeen *Lælia cænosa*, and the prices varied even more than the condition; pairs fetched respectively 26/–, 18/–, 12/–, and as low as 6/–; three males 8/–; four males, fairly good ones, 13/–. The female of this species seems to bring more than the male, no doubt on account of the latter being so much more freely attracted to light. No specimen, however, of either sex has, as far as I know, been taken for many years. Two *Lasiocampa ilicifolia*, viz., a very tiny male fetched 12/–, and a nice female, from Castle Eden, 32/6. The collection was rich in *Cleora viduaria*; six pairs made 12/–, 22/–, 24/–, 18/–, and 8/–. Two unusual vars. of *Abraxas grossulariata*, the first asymmetrical, and the second fore wings black with white band and hind wings rayed, brought 20/– and 30/–. Four lots of *Phibalapteryx polygrammata*, four in a lot, realised 24/–, 12/–, 12/–, and 16/–; their condition, however, as before stated, was very poor, some of the bodies being either mere shells from mites, or wanting altogether or in part. Three lots of *Drepana sicula*, three in a lot, went for 21/–, 13/–, and 18/–. Six pairs of *Dicranura bicuspis*, all bred from Tilgate Forest, 26/–, 20/–, 18/–, 10/–, 18/–, and 17/– a pair. A nice variety of *Pygæra curtula*, 21/–; a ditto of *Notodonta ziczac*, 30/–. The "wainscots," in which one would have expected the collection to have been especially rich, were not remarkable, except perhaps as regards *Senta ulvæ*. One lot of seven of the latter, containing the vars. *nigrostriata* and *bipunctata*, with several inferior *Meliana flammea*, fetched 16/–; a similar lot, 12/–. A lot of seven containing the above two vars., with a fine and interesting intermediate var. between *bipunctata* and *wesmariensis*, fetched 32/6, and a fine specimen of the latter variety, 26/–. *Xylomiges conspicillaris* were a drug, and went (with others) for about half-a-crown each. Pairs of *Crymodes exulis*, dark form and good specimens from Perthshire, made

28/–, 28/–, and 35/–; a light form from Shetland, 12/–. A specimen of *Luperina dumerili*, one of the original ones from Portland Lighthouse, fetched £2. Two male *Hydrilla palustris*, 35/–, and a pair, £3, all being taken by Dr. Wheeler at Wicken Fen 1877–1880. The *Agrotis ashworthii* were fine and bred, and made about 2/6 each. The *Noctua subrosea* were only middling (how seldom one sees this in good condition); pairs realised 16/–, 35/–, 21/–, and 20/–.

On the 16th of July Mr. Stevens disposed of a few odd lots of British Lepidoptera, including a long series of *Colias edusa* var. *helice*, and other varieties, the ownership of which was not disclosed, but they were believed to be the property of a well-known London dealer. Most of the *helice*, I should imagine, were bought in. I bought a nearly black *Apatura iris* for 3/–; its price and appearance, however, I am afraid, both point to a foreign origin. A fine *Argynnis aglaia*, nearly black, taken by Mr. Gulliver in 1893, fetched £6 6s.; and another variety, even finer in condition, taken by Mr. Harper in the same year, realised £8 10s., both specimens going to enrich possibly our finest English collection. A beautiful streaked male, also in superb condition, fetched £6, a black *Arctia caia* £3 3s., and one with asymmetrical fore wings 20/–. A female *Chrysophanus dispar*, from Nash's (query Naish) collection, 35/–; two females, in poor condition, 30/–; and a pair, from Bennett's collection, 50/–.—Thos. Wm. Hall.

CAPTURES AND FIELD REPORTS.

Sphinx pinastri in Suffolk.—When driving through the fir woods this afternoon I came across two examples of *S. pinastri* in nearly the same place as I took some specimens in 1892 and 1893. Last year we could not find a single specimen.—Rendlesham; Rendlesham, Woodbridge, June 23rd, 1895.

Deilephila livornica in Sussex.—A curious incident has just occurred. I had just been reading of the capture of *D. livornica* in Devonshire (*ante*, p. 206), and to myself expressed aloud the desire to possess that rare and beautiful species, when the gardener sent in to know if I would go and see whether a large moth was worth catching that had been disturbed whilst cutting the grass upon a bank of irises with a reaping-hook. Judge of my surprise and gratification when I saw a fine large female *D. livornica* settled upon the flint-wall in front of me. In less than a minute I was the fortunate possessor of the very insect I had five minutes before been wishing to obtain. It is a fine female (as to size), though not in its freshest garb, but is a very fair specimen. My gardener seems equally proud, as now he says I cannot say he is always sending for me to come and catch a "buff-tip" or "yellow-underwing."—Chas. E. Morris; Vernon Lodge, Preston, Brighton, July 1st, 1894.

Plusia moneta, &c., in Kent.—On the morning of June 24th one of the servants brought me a fine specimen of *Plusia moneta*, which she had found at rest on a window-curtain. It is a very large specimen, and evidently freshly emerged, judging from its splendid condition. *Cucullia umbratica* seems abnormally abundant this season in this district. They may be taken by the score hovering round the blossoms of the red valerian, for which they have a strong partiality. I also took a good specimen of *C. asteris* at the valerian on the night of June 25th.—H. W. SHEPHEARD-WALWYN; Glensyde, Bidborough, near Tunbridge Wells, June 26th, 1895.

VANESSA URTICÆ ATTRACTED BY LIGHT.—A fine specimen of *Vanessa urticæ* flew into my room last night, about 10 p.m., apparently attracted by the gas-light.—T. H. HARKER; The Grove, Harrow, July 7th, 1895.

HELIOTHIS ARMIGERA AT VALERIAN FLOWERS.—On July 5th I had the good fortune to capture a very perfect specimen of *Heliothis armigera*, which was hovering over the blossoms of the common red valerian in the garden about 9.30 p.m.—H. W. SHEPHEARD-WALWYN; Glensyde, Bidborough, near Tunbridge Wells.

MACROGLOSSA FUCIFORMIS IN MIDDLESEX.—I have pleasure in recording the capture of *Macroglossa fuciformis*, an example of which fell to the net of my brother, Percy H. Smith, on the morning of June 16th, in Eastcote Woods. The specimen is somewhat battered.—C. RHOADES SMITH; Greenhill, Harrow, July 4th, 1895.

AGROTIS ASHWORTHII.—While spending a few days at Llanfairfechan, early in July, I made a pilgrimage to the Penmaenmawr locality for the above insect, and was fortunate enough to take, after two visits, eight perfect specimens, seven at rest and one at sugar; I sugared on two occasions, but only took the one example of *A. ashworthii*, though scores of *Xylophasia polyodon*, &c., came to the sweets. I also found, by close searching, a considerable quantity of ova, and now have about 150 larvæ feeding well on sallow.—R. TAIT, JUN.; Cheetham Hill, Manchester.

APATURA IRIS.—On the 13th I was fortunate enough to take a male *Apatura iris* on the wing, in splendid condition, at Lyndhurst, Hants.—GEO. STANLEY MORLEY; Oakdene, Epsom, July 16th, 1895.

VENUSIA CAMBRICARIA IN WALES.—I should like to know if *V. cambricaria* has been recorded from Wales in recent years. Newman writes, "is said to have been taken in Monmouthshire." On the 9th inst. I took a very nice specimen near Avenig, in Merionethshire. My friend Mr. Woodforde and myself took twenty-eight specimens of this insect in a wood near here on the 6th and 7th inst.—E. W. H. BLAGG; Cheadle, Staffordshire, July 18th, 1895.

VARIETY OF ARCTIA CAIA WITH YELLOW HIND WINGS.—On June 26th a specimen of *A. caia* emerged, in which the hind wings are a good yellow, with the usual blue markings, differing but slightly from the ordinary form. The fore wings have a whiter ground than usual, but the markings are very distinct. The body is yellow, with four black stripes, and the collar on the head is dark yellow, but not very distinct. The specimen was bred from a larva taken in the district with others, three of which have yellow bands (and one with spots as well) round the blue spots on the hind wings.—J. T. FOUNTAIN; 58, Darwin Street, Birmingham, July 17th, 1895.

SOCIETIES.

North London Natural History Society.—The usual Whitsuntide excursion to the New Forest started on Friday, May 31st, 1895. Messrs. Robbins, Nicholson, and Bacot met at Waterloo at 5.30, and journeyed by the 5.50 train to Southampton. On arriving at Lyndhurst the party was augmented by Mr. Harvey, who boarded the bus half-way between the station and the town. On arriving at No. 2, Lynwood, the usual generous spread was discovered, and was rapidly reduced to scarcity by the efforts of the four hungry North Londoners.

The following morning turned out cloudy and wet, and an early excursion by Messrs. Bacot and Nicholson produced no result worth mentioning. The morning continuing showery and unpropitious, Messrs. Robbins and Nicholson stayed indoors till just before dinner, when they essayed a little larva-beating in Beechen Lane, but the result as regards the larvæ was a decided failure. In the afternoon these gentlemen repeated the experiment of the morning in Denny Wood, and the principal captures were a fine *Notodonta trepida*, a good *Anaitis plagiata*, and a brown specimen of *Grammesia trigrammica*, all evidently just out; and larvæ of *Asphalia ridens*, *Brephos parthenias*, and others. Messrs. Bacot and Harvey also visited Stubby and Denny Woods, and added *Tæniocampa miniosa* and *Amphidasys strataria* among others to the list of larvæ, and extended the records of imagines by *Tephrosia punctularia*, *Bupalus piniaria*, and *Scodiona belgiaria*, &c., &c. In the evening the party proceeded to sugar about half a mile of trees in Hurst Wood, and took *N. trepida* for "assembling" purposes. The sugar, however, proved totally unattractive, as also did the *trepida*; the latter result was not surprising, as the specimen on further investigation turned out to be a male. The only captures made were some fine specimens of *Larentia viridaria*. The night was clear, cool, and damp, and there was a bright moon.

On Sunday Messrs. Bacot and Harvey spent the day at Stubby and Denny Woods, and by beating obtained about 120 larvæ of *Tæniocampa miniosa* and some two dozen *Asphalia ridens*; *Euclidia glyphica* and *Thera variata* were also captured in fine condition, likewise two male *Pararge egeria*. After church Messrs. Robbins and Nicholson went for a stroll along the Minstead Road, and took some good specimens of *Tephrosia punctularia* and *Thera variata*, and a freshly emerged *Hadena thalassina*. These were found at rest on young firs on a piece of boggy land, which was plentifully bespattered with the two sundews (*Drosera rotundifolia* and *D. longifolia*) and the bog asphodel (*Narthecium ossifragum*). A moth believed by Mr. Robbins to be *Lobophora halterata* was seen, but unfortunately missed. In the afternoon Mr. Quail turned up about four o'clock, having taken a fresh specimen of *Hadena genistæ* on the way from the station. In the evening the whole party went to Matley Bog, but with the exception of some good specimens of *Hypsipetes trifasciata*, *Lobophora sexalisata*, *Eupithecia nanata*, and *Pachycnemia hippocastanaria*, nothing fresh was turned up. A nice lot of *Scodiona belgiaria* were captured on White Moor afterwards in bright moonlight.

On Monday morning Messrs. Bacot and Quail were out early, but did not take anything of note except a fine specimen of *Acronycta leporina*. After breakfast the party set out to spend the day at Stubby Copse, capturing on the way some fresh specimens of *Tanagra atrata* and two *Nemeobius lucina*. Larva-beating produced about half a dozen *Pœcilocampa populi*, two or three *Asteroscopus sphinx*, one *Thecla quercus*, and many other commoner species. Mr. Nicholson found a larva of *Limenitis sibylla* suspended from a grass-stem, ready to pupate; and Mr. Harvey found another *A. leporina* at rest on a fir-trunk. The party then adjourned to New Copse Cottage for milk, and afterwards wended its way back to Lynwood for tea, returning home the same evening.—LAWRENCE J. TREMAYNE, *Hon. Sec.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*June* 13*th*, 1895.—Mr. T. W. Hall, F.E.S., President, in the chair. Mr. Frohawk exhibited a dark leaden-blue var. of *Lycæna bellargus*, Rott., taken at Weymouth in 1892. Mr. Perks, a *Julus* taken among bananas in Covent Garden. Remarks were made by several members on the season, and a few records were made of the appearance of *Colias edusa*.

June 27*th*.—The President in the chair. Mr. Jäger, a series of *Arctia lubricipeda*, Esp., bred from *radiata* parents. Among them were both var. *radiata* and var. *fasciata*, as well as some almost normal types. Mr. Turner, eggs of the lace-wing fly. Mr. Dennis, a larva of *Catocala nupta*, L.; a pupa of *Lycæna argiolus*, L.; and a pale specimen of *Argynnis selene*, Schiff. Mr. West (Greenwich), specimens of *Cryptocephalus nitidulus*, Gyll.; *C. aureolus*, Suf.; and *Elater elongatulus*, Ol., all taken in Headley Lane on June 3rd.—HY. J. TURNER, *Hon. Report Sec.*

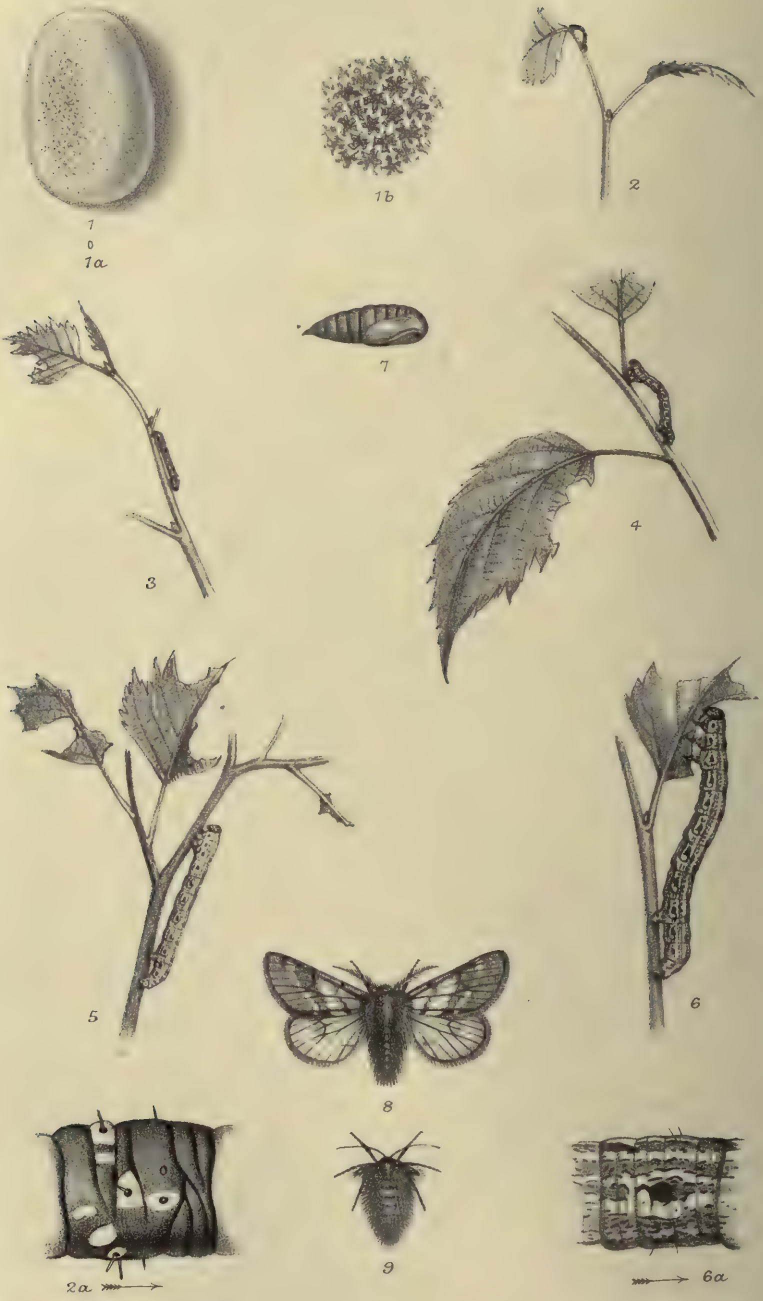
BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*June* 17*th*, 1895.—Mr. R. C. Bradley in the chair. Exhibits:—By Mr. A. H. Martineau, *Sinodendron cylindricum*, male, from Solihull; *Criorrhina asilica* from Trench Woods; and some unusually fine specimens of *Andrena rosæ* var. *trimmerana* from Clifton Downs. By Mr. Abbott, a number of Lepidoptera taken during a three days' trip to Wicken at the end of May; amongst others were *Arsilonche albovenosa*, *Meliana flammea*, *Nascia cilialis*, *Acontia luctuosa*, *Myelophila cribrum*, *Earias chlorana*, *Lithostege griseata*, *Hydrelia uncula*, *Bapta taminata*, and *Phibalapteryx lignata*. By Mr. C. J. Wainwright, fine series of *Asthena luteata* and *Eupisteria heparata* from Cannock Chase. By Mr. R. C. Bradley, a number of grassheads from Sutton Park covered with great numbers of *Melanostoma scalare*, which had been killed by a fungus. He found great numbers, but only in a spot a few yards square; and all were on the grass flowerheads only. There was only the one species too; they had evidently been attacked by the fungus and had then gathered together at the one spot to die. While he was watching they continued to arrive and remained to die. He also showed an ichneumon, the thorax of which, when taken, was covered with bright red parasites of large size; it made the insect look, when caught, as if it had a very large bright-red thorax. The parasites seemed like beetle larvæ. He also showed a specimen of *Crabro palmipes*, with a cluster of eggs at the base of the wings on one side; both these were from Sutton. By Mr. Valentine Smith, the following from Cannock Chase:—*Pterostichus lepidus*, *Cymindis vaporariorum*, and *Thymalus limbatus*. — Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

A Manual for the Study of Insects. By John Henry Comstock, Professor of Entomology in Cornell University, and in Leland Stanford Junior University; and Anna Botsford Comstock, Member of the Society of American Wood Engravers. 8vo. Ithaca, N. Y. 1895. Pp. xii, 701. Six plates (one coloured), and woodcuts.

In the present handsomely got-up and extremely *heavy* volume (in the literal sense), Prof. and Mrs. Comstock have published a very useful work, profusely illustrated by the "Junior Author," on the insects of the United States. It consists of a series of chapters: one devoted to Zoological Classification and Nomenclature; another to Crustacea, Arachnida, and Myriapoda, in which the largest amount of space is allotted to the spiders, and the remainder to the seventeen orders into which Prof. Comstock divides the insects proper, the old order Neuroptera especially being broken up into no less than ten. Several of the other orders are divided into "suborders"; thus the Anoplura are treated as a degraded "suborder" of the Hemiptera, and placed between the other two "suborders," the Heteroptera and Homoptera. The Rhynchophora are also treated as a separate "suborder" from the remainder of the Coleoptera; and, what will seem stranger to many British entomologists, the Lepidoptera are divided into two "suborders," the Jugatæ and Frenatæ: the first containing only the Hepialidæ and Micropterygidæ (distinguished by having the fore and hind wings similarly veined, and connected by a long lobe instead of a frenulum); and the Frenatæ, including the remaining Lepidoptera, commencing with the Psychidæ, Cossidæ, &c., and ending with the butterflies. All systematists know the impossibility of attempting to sketch out a linear system which will carry on one order, or even, in many cases, one family, to the next, through the genera which are really the intermediate links; but we do not see that the existing arrangement is improved by ending the Lepidoptera with the Nymphalidæ, and passing on to the Diptera as the succeeding order. A great number of good illustrations are given of typical North American insects of all orders; and the tables of families and genera, though they cannot of course be expected to apply throughout, except to American species, will be found of great value to all entomologists. Notwithstanding certain defects and deficiencies, to which we need not further allude here, we can cordially recommend this book to any British entomologist, whether a beginner, or a student who already possesses some knowledge of Entomology, who wishes to extend his knowledge beyond the confines of our own islands.

Entomologist 1895. Plate I.



F. W. Frohawk del. et lith.

West, Newman imp.

Nyssia lapponaria.

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LIFE-HISTORY OF *NYSSIA LAPPONARIA.*

By F. W. Frohawk, F.E.S.

Plate I.

On May 6th last I received from Mr. W. M. Christy some ova of *Nyssia lapponaria*, who very kindly sent them to me for the purpose of figuring and describing the insect in its various stages; and having done so I now have the pleasure of publishing the following life-history and accompanying figures of the species through all its stages.

Figs. 1, 1*a*.—The ovum is of a compressed oval form, with one end rather larger than the other, and measuring in its greatest diameter $\frac{1}{26}$ in.; the surface is delicately and beautifully reticulated with a quinquefarius pattern; each cell is mapped out with finely raised ridges shown in Fig. 1*b*. The colour is of a very clear bright greenish-yellow; a few days before hatching it deepens in colour, and gradually becomes deeper, until, shortly before hatching, it assumes a very deep metallic blue-green hue. The ova hatched between 5 and 6 p.m. on May 16th. Directly after emergence the larva measures $\frac{1}{12}$ in. while extended; if disturbed it falls, suspending itself by a web, and if falling upon the ground remains for a short time in a looped attitude.

Figs. 2, 2*a*.—The larva in its first stage and when ten days old; it is $\frac{1}{6}$ in. long, cylindrical, and of uniform thickness throughout; the ground colour is a deep dull black; the first segment has the anterior edge white, forming a collar and encircling the segment; immediately behind the collar is a series of very minute warts, each beset with a short fine bristle; the 4th, 5th, 6th, 7th, and 8th segments are each encircled with a number of pure white markings, consisting of fourteen on each segment (seven on either side), Fig. 2*a*; the dorsal pair are longest, and are separated by a medio-dorsal black line; these, as well as the two largest lateral spots and the lowest ventral one, have each a black central wart emitting a short whitish bristle; the 2nd, 3rd, 9th, 10th, 11th, and 12th segments are principally spotted on the lateral region; the head is black, with white spots at the mouth; the legs and claspers are black. During the first stage the larvæ fed upon both birch and whitethorn, and appeared to prefer the latter if one more than the other. The first moult occurred on May 31st.

Fig. 3.—Before second moult, twenty-one days old, it measures $\frac{3}{10}$ in. long; the ground colour is lilac-brown with fine white longitudinal lines running the entire length, which are dorsal, sub-dorsal, super-spiracular, and sub-spiracular; on the 4th, 5th, 6th, 7th, and 8th segments are six lemon-yellow spots (three on each side), and of the same form as in the previous stage, one being dorsal and forming a transverse mark, the other two on the spiracular line, one elongate transversely, the second round, and each having the black central wart emitting a short hair as in the previous stage; the head, legs, and remaining details being likewise similar. It rests in a straight attitude, with the head slightly bowed, and the first three anterior segments slightly arched, thereby drawing together the two first pairs of legs; a silk cord from the mouth is attached to the stem while resting. The second moult took place on June 6th.

Fig. 4.—Before third moult, when twenty-six days old, it is $\frac{9}{16}$ in. long; the body is of uniform thickness and cylindrical; the ground colour is whitish with a lilac-grey tinge, becoming yellowish shortly before moulting; it is chequered with black markings that are arranged in longitudinal bands, which are medio-dorsal, sub-dorsal, super-spiracular, and spiracular; the spiracular row is formed principally of conspicuous black blotches, commencing on the 4th and ending on the 11th segments; immediately below these markings is a series of bright light yellow markings running the entire length; the dorsal markings, as in the previous stage, are also bright yellow; the ventral surface is similarly coloured and lined as on the dorsal region, but rather uniformly darker; the head, legs, and claspers are grey, speckled and streaked with black. It generally rests in a straightened attitude. The third moult happened on June 11th, and directly after moulting the ground colour is a light olive-yellow; all the markings are as in the previous stage, but brighter and more clearly defined; the head, legs, claspers, and anal segment are all of a clear pinkish-white speckled with pale olive, the colouring of these parts remaining such but for a short time. The cast skin is not eaten by the larva of this species.

Fig. 5.—Before fourth moult, thirty-two days old, it measures $\frac{9}{10}$ in. As in the previous stage it is cylindrical, and of uniform thickness throughout; the ground colour is pale primrose-yellow; the longitudinal bands, which are outlined with fine

black lines composed of numerous black specks and streaks, have the inter-space of a leaden-drab colour, these bands being divided by primrose-yellow lines, thus forming longitudinal rows of alternating stripes; the leaden-drab stripes are medio-dorsal, sub-dorsal, super-spiracular, and spiracular; on the latter band are situated the spiracles, which are small and intensely black; each is placed on a squarish dull deep black spot forming a conspicuous row of spots, each is bordered on the lateral and posterior sides with bright lemon-yellow, the yellow being again relieved laterally by a black streak; on the posterior half of each segment uniting the medio- and sub-dorsal bands is a short transverse lemon-yellow bar united to a black spot in the sub-dorsal band; the remaining details are in every way similar to the previous stage. It rests in a straight position upon the stems of birch, frequently straight along the stem, but sometimes only with its claspers grasping it, and the head a short distance away, but always with a silken thread from its mouth to the stem. The fourth and last moult took place on June 18th.

Figs. 6, 6*a*.—After fourth moult, forty-two days old, and fully grown, it measures 1½ in. in length; in every detail the preceding description agrees precisely with this stage, excepting that the yellow markings are now rather deeper, of a gamboge-yellow, and the ground colour of the dorsal surface is also rather deeper, and of course the size increased when fully grown. The ground colour varies in different specimens; of the four larvæ in my possession three having the yellow of different depths, and the fourth of a decided lilac-drab hue; this, with the black markings, assumed quite a deep drab-brown, closely resembling the colour of the birch-stems.* The first larva buried for pupation on June 27th, remaining in the larval state forty-two days.

Fig. 7.—The pupa is $\frac{6}{10}$ in. in length; the head and thorax uniformly rounded in front; round the middle of the wings it is rather contracted; the fifth abdominal segment, including the apical portion of the wings, is swollen; the remainder of the abdomen being attenuated; the posterior segment terminating in a slightly curved conical point cleft at the end; on the same segment at either side is also a short point; the entire surface is finely granulated; the head, thorax, and abdomen of a deep red-brown; the wings, antennæ, and legs are light sienna-red; the eyes are rather conspicuous and blackish. It has no cocoon, being simply buried an inch or two under the surface of the earth.

The following descriptions are taken from a pair of specimens kindly lent me by Mr. Christy:—

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* Mr. Christy, referring to this colour variation in a letter recently received from him, says: "The ground colour varies considerably; I have had them dark purplish-brown so that they matched the birch-twigs, and I have had them almost putty-coloured."

Fig. 8, Male.—Measures in expanse $1\frac{5}{12}$ in.; in general form resembling *N. zonaria.* Primaries, ground colour is greyish-white with a slight ochreous tinge, which colour chiefly occupies the whole of the basal half; four transverse smoky-black bands traverse the wing, the first one is narrow, and situated on the basal fourth, the second traversing the middle, and disconnected from the third by a narrow band of the ground colour, the latter is simply separated from the marginal band by a fine and indistinct zig-zag pale line; all the bands run parallel with the hind margin, and are deep black on the costa and inner margin; the neuration and hind margin is clearly defined by black; the costa is bright orange-tawny, which is sharply broken up by the black of the four bands; the fringe is smoky-black. Secondaries rather duller in ground colour, and having a mere indication of a submarginal whitish band, and a central blackish band indicated by a short transverse bar at the inner margin, and again by the faintest bar close to the disco-cellular nervule; the neuration, margin, and fringe similar in colouring to the primaries; antennæ are strongly pectinated; head, thorax, abdomen, and base of legs thickly clothed with long hairs, which are black, grey, and orange-tawny, the latter occupying the front of the head, sides, and down the centre of the thorax and down the centre of the abdomen, where they are shorter and grouped in tufts, one on each segment; the legs are black.

Fig. 9, Female.—Apterous; antennæ are simple, but when viewed with a strong lens they appear rather thickly scaled and slightly ciliated; the head, thorax, abdomen, and legs are similar in colouring to the male, but the thorax is less hairy in the female.

Mr. Christy has kindly communicated the following concerning the habits of the imago:—

"The insects are decidedly sluggish and disinclined to fly, even at night. My idea is that their time of flight is in the day, and when the sun shines. The ovipositor of the female is very long, quite a quarter of an inch. The eggs were laid through some green leno; several folds of it had been tucked inside a chip-box, and the eggs were laid between the leno and the box. The female must be able to push her eggs into any chink or crevice quite out of harm's way. I have noticed that *Amphidasys strataria, A. betularia,* and *N. hispidaria* all like to deposit their eggs in the same way, that is, pushed a long way into some narrow chink, or between folds of muslin or leno. The eggs are laid in a rough untidy batch, sometimes somewhat overlapping one another, precisely after the manner of *N. hispidaria,* and to the naked eye they are in size and shape exactly like those of that species, but the colour is different. The female when alive is round and plump, but loses its shape when killed, and becomes flattened and wedge-shaped towards the tail. She will live for two or three weeks."

VARIETAL TERMINOLOGY.

By W. F. de Vismes Kane, M.A., F.E.S., &c.

Mr. Mansbridge's paper on varietal terminology (*ante*, p. 213) broaches a subject which it would be very desirable to have settled, and the question, being a more or less abstract one, should certainly be capable of easy solution by a consensus of opinion, though its strict application may always offer some difficulty. The standard unit of classification must be the species. And however the definition of a species may be enunciated, there seems at least one essential and fundamental element which must enter into it, *i. e.*, the capability to produce fertile progeny. There may of course be exceptions to the rule of hybrids being sterile; but the law is sufficiently stringent to supply a working basis. Therefore all variations that are capable of producing fertile offspring from a union with the typical specific form are merely subsidiary deviations from the central type. It certainly would be advantageous, if it were possible, to select in every case the central and most universally prevalent form of each species for the type of each group. But the necessities of synonymy require us to maintain the first described form as the type of the species; and this system, though biologically defective, is not beset with much practical inconvenience. What, then, are the lines we should follow in indicating the various deviations from the type; that is, a form which represents theoretically a perfect succession of typical characters?

In the first place, it is undeniable that each individual of the progeny invariably, so far as we can ascertain, differs in some degree, however small, from the parents. Where the divergence is sufficiently appreciable to make it convenient to ear-mark it, it may be well to name it and class it as an "aberration,"—a term wide enough to include every (no matter how narrow or wide) branching from the main stem. The greatest part, however, of such aberrant forms disappear as they arise, mainly through the action of extensive interbreeding, and so these eccentricities become neutralised by the operation of the law of heredity. But when isolation becomes a factor, and compels in-and-in breeding among such aberrations; or some similar determinant interferes, such as the principle of the "survival of the fittest"; the aberrational characteristic becomes fixed and inherited in a more or less degree; thus giving rise to a permanent "variety." As in a kaleidoscope, there are patterns rapidly succeeding each other, and disappearing never to return except after the lapse of long periods; while others, from the nature of the materials, reappear more or less identically at frequent intervals, offering salient characteristics worth notice. And similarly with the shifting factors which control zoological evolution; for we find from time to time aberrations cropping up, which would not seem to be founded upon any ancestral tendencies, but to be sporadic, and which only evidence the production of similar results from similar causes. The very rare and strangely similar aberrations of the undersides of certain of the Vanessidæ are cases in point.

When, however, recurring inherited variations occur and are either local or resulting from seasonal influences, or from what is termed mimicry, &c., we feel it necessary to define their characters more fully than by the inclusive term "variety" formerly applied to all. In classification, however, it hitherto has been thought sufficient to compile a list discriminating only on the one hand between the adventitious or occasional appearance of any variation meriting record, and on the other, those of similar importance which are reproduced in inherited sequence. These classes of forms are almost universally termed "aberrations" and "varieties" respectively in such catalogues as Staudinger's. A few authors, indeed, shut their eyes to even this fundamental distinction, which indicates a difference between the fleeting and the stereotyped variation, and apply the term "variety" to every deviation from the specific type. It is true that the border line between the stable and the unstable form is not absolutely definable; but if such an objection be insisted on, we should have to acknowledge what we must be convinced of theoretically, that the definition of species is beset with similar defects. But this school is not likely to satisfy the requirements of the present day, for the tendency, as pointed out by Mr. Mansbridge, is rather to adopt a more complex terminology, capable of more precisely indicating the idiosyncrasy, so to speak, of the variety in question. And though in classified lists a multiplication of such terms might be redundant and unnecessary, yet in zoological literature their use is almost imperative as our knowledge accumulates. The question therefore becomes narrowed into the consideration of what classes of varieties require special designations suggestive of some salient feature of their phylogeny, or distribution, or morphological attributes. And here I would point out that some synonymous general terms are very valuable. The words "variation" and "form" are of the utmost value to a writer when he wishes to avoid tautology, or speak indefinitely. The "forms" or "variations" of any species may thus be spoken of generally; and then defined particularly as "aberrations" or "varieties" as the case may be. It would be a pity to abolish our indefinite terms; for if we do, literary necessities will oblige other substitutes to be employed. The terms "form" and "variation" therefore might advantageously remain without any restrictive application, as has generally been the usage hitherto. Now as to the divisions into which it might be desirable to arrange varieties. One of these should embrace such forms which have apparently a congenital origin, such as those which reappear from time to time without any assignable environmental interference. The black variety of *Amphidasis betularia* may be instanced, which crops up sporadically in many districts without founding a permanent colony. In other localities, however, it has become a local race, and requires to be suitably designated. Many other varieties also appear to be entirely referable to ancestral tendencies, occurring in wholly divergent climates, and in regions widely differing in geological and meteorological conditions. Such, I think, are certain of the varieties of *Aporophyla lutulenta.* It would be equally necessary to designate sexual and seasonal dimorphic varieties, mountain forms, and those which depend on a high or low range of temperature, or mimicry. The late Mr. Jenner Weir suggested certain terms for some of these; and "oromorphic" and "pediomorphic" have been used for mountain and lowland varieties; but until zoological authors generally come to some common decision on the subject, any writer of less degree who avoids a periphrasis by the use of unusual terminology, runs the risk of the stigma of pedantry.

Drumreaske, August, 1895.

THE SENSES OF INSECTS.

By J. Arkle.

In the 'Entomologist' (*ante*, p. 30) Mr. Watson contributes an interesting article on these speculative topics from the standpoint of the scientist, while I, in a previous number (Entom. 336) record some observations which may occur to the lay mind.

The error of supposing the existence of an additional sense in insects appears to have partly arisen from a misconception of the power of smell. But, asks Mr. Watson, "What about the antennæ?" There is, indeed, much to be said about the antennæ, for "authorities" have loaded them with almost every sense, including this popular superstition. But why the special development in those of the male? Simply, I reply, because, at any rate in Lepidoptera, the male *seeks* the female, as is proved by the habit of assembling. Therefore the male requires, according to circumstances affecting species, special developments in these antennæ or feelers.

Whether the pituitary body in vertebrate embryos, or, indeed, that anomalous organ in the adult human brain, be a sense structure, a glandular body, or partly sensuous and partly glandular, are matters which still exercise the physiologist. Puzzles they still remain when we exclude such words as "probably" and "may." But let us accept the organ, for the moment, as thoroughly understood,—as the seat of a sense or function now lost,—and contemplate the survey of vertebrate atrophy. The internal and external ear form one of the most popular studies in animal physiology. This is not the place to attempt anything like a description, so I will refer the reader, if necessary, to such text-books as 'Elementary Lessons in Animal Physiology,' by the late Professor Huxley. And I feel sure that a digest of the subject will secure my pardon for refusing to believe there can be any analogy between our auditory mechanism and the gill-cleft of a fish. The tympanum alone shows fixed design—and by a Master Hand who knew his mind.

Dictionaries may tell us atrophy means a wasting away, but, amidst the hypothetical structures supporting an additional sense, it is pleasant to find that the human vertebrate, if anything has been lost, has nevertheless been a gainer on the whole. Our progenitors may have had antennæ, or revelled with the fishes in the vasty deep; but we are more comfortably off in the mechanism of hearing, and live in drier conditions. We live longer, and our dimensions have so enlarged that we cannot get inside the armour of our forefathers.

Coming back to Entomology, what is this supposed sense? Obviously it is a sense of direction, whatever other adjunct it may possess. But Sir John Lubbock, supported by Mr. Romanes, shows, in his 'Senses of Animals,' "that there is no sufficient evidence among insects of anything which can justly be called a sense of direction."

Let us now consider what is meant, entomologically, by "assembling." It is a gathering of the male sex to the female, and from distances clearly beyond the reach of sight or sound. It cannot be confounded with such phenomena as the stridulation of beetles. It has been abundantly proved (Entom. xxvii. 337) to be the result of extraordinary powers of smell. But Mr. Watson concludes, from a note by the Rev. G. H. Raynor (Entom. xxv. 121), that some other influence is at work in addition to that of scent. What are Mr. Raynor's words? They are these:—"Even during a stiff breeze I have seen males *come up* from all quarters of the compass"—the italics are mine. Unless Mr. Raynor corrects me, I regard the last phrase as a figurative expression, or why use the words "come *up*"? If the quotation is to be taken literally, then I venture to say Mr. Raynor's experience stands alone, and is even unsupported by Mr. Watson, who quotes it. For what does Mr. Watson say? He says:—"Scent cannot travel against the wind, and in all the assembling expeditions I have been on, the males always came against the wind; and when, in their eagerness, the males overshot their mark and went past the female, they lost the scent and flew up, soared away on the wind, dropped close to earth again, and then, having regained the scent, came sailing along."

In approaching the question of hearing, it is interesting to observe two great insect divisions—those which emit audible sounds and those which do not. In the first division, the bee, housefly, gnat, some of the beetles, cricket, and grasshopper may be cited as examples; in the second, butterflies, moths, dragonflies, ants, and many dipterous insects. I am aware that objection may be made to this classification, but it is the result of close observation. In the prevailing desire to show that all classes of insects produce audible sounds, I feel bound to say that science in making the claim for, say, dragonflies and the peacock butterfly (*Vanessa io*), appears driven to extremity. And my observation compels me to doubt if the hum of the bee, as an example of humming insects, is to be at all attributed to wing-vibration. Rather is it, I believe, to the possession of musical spiracles used in flight for the inflation of the body. Nature has landscape sounds for our ears, just as she provides scents for smell or colours for the eye. What though all insect sounds are not agreeable—neither are all flower scents, or flower colours! For monotony is not conducive to human pleasure, but contrast is! Enough, however, has been said to show that some insects produce audible sounds, and I have dilated upon the point because it has been suggested that such insects can necessarily hear. On the other hand, it is obvious that the mere ability to produce sound is no proof that a creature can hear at all.

Stories, nevertheless, are related of scientific observations pointing to the conclusion that some, at any rate, of the insects named can not only hear, but interpret the sounds they produce. If in the study of these narratives there arises a suspicion that science can end and enthusiasm begin, there is certainly a general testimony in favour of the possession of auditory powers which has all the weight of highest authority. Thus we hear of the queen bee using her vocal chords in an address to her subjects, the beetle finding his mate by her stridulation, the female cricket the male by his chirruping, &c.

References such as these would be incomplete if the scientist could not point to auditory "organs" in sound-producing insects. Instead of loading the antennæ with sole responsibility, these structures are now considered to divide the function with others distributed over various parts of the body. Thus we are told of the "halteres" at the wing-bases of flies, the tympanum on the first abdominal segment of true locusts, and the ears carried by crickets on their legs. Touch, we know, is distributed over the whole of an insect's body. Whether these microscopic "organs" are in conjunction with touch, or hearing, may for the present be dismissed to the specialist and the lens of the future. Neither can I afford more than a passing reference to what is inferred from the behaviour of a gnat fixed to a microscope-slide. If similarly fixed, with our hands free, we should, on the slightest visible movement, act exactly with our "feelers." The insect may have exhibited only sensitiveness to concussion or vibration, which is an entirely different thing from hearing. And the alleged "love song" of the gnat happens to be the same as that of the mosquito—a fact which may be of use to the student in the origin and development of species.

Admitting evidence in favour of the auditory powers of certain insects, let us take the following illustration, since Lepidoptera are included, as a test of their efficiency and scope. Here is a cavalry regiment coming along the street preceded by its band! The band rein up close to the parapet, and play the troopers past to their billets. Just behind, and resting under a window-sill, is a *Melanippe fluctuata*. Neither the metallic clink of the cavalry horse-shoes, nor the different classes of musical sounds through all the instruments down to the kettledrums, cause our insect to move in the least. When the band and troopers are gone, we touch its wing-fringe with a walking-stick, and away it goes! *M. fluctuata* is evidently an example whose acoustics do not include an antithesis. It is useless to suppose the moth sensitive to sounds beyond our auditory powers. Such sounds must be shown to exist.

The incident just related is an illustration from one of the classes of insects I regard as mute and deaf. Further, it is a fair sample of the behaviour of any insect tested by similar circumstances. Assuming certain species possess auditory powers, hearing, even in their case, is a most rudimentary sense, and far inferior to what is understood by the term as applied to vertebrates. It serves no purpose as a warning and protection. Nor is this fragment of a sense as generally exhibited as the sense of sight. Neither the simple nor the compound eye in insects is governed by muscle control, that is, there is no focussing power. I have never, therefore, been able to detect an insect that could distinguish an object at more than a dozen yards on the most liberal computation. Yet the sense of sight, so far as it extends, is so universally distributed that any insect can be made to demonstrate that it can at any rate see light. There may, however, so we are told, be fifty additional, aiding senses. If, I reply, it can be shown there is one, we may well reconsider our place in the ranks of created things, and our right to put an insect into the cyanide bottle.

Chester, August 13th, 1895.

ON THE ORIGIN OF THE EUROPEAN RHOPALOCERA, AND THE EFFECTS PRODUCED BY THE GLACIAL PERIOD UPON THEIR PRESENT DISTRIBUTION AND DIVERSITY.

By W. Harcourt Bath.

Geologists inform us that there was a period in the history of this planet when the earth existed in a molten red-hot state, analogous to that which holds sway at the present time in the smaller mass of Mercury. During the course of many millions of years its great heat gradually sublimed, until it was reduced to a temperature capable of supporting animal and plant life.

The two extremities of the earth were most probably the first points where life first commenced to make its appearance, since they were undoubtedly the first portions of this planet which possessed a sufficiently low temperature for its production. But whether the North Pole or the South Pole was actually the first to evolve animals and plants, is a problem which requires elucidating; likewise as to whether two identical or distinct groups of fauna and flora came into existence at either extremity independent of each other, and which for a long time were unable to intermingle on account of the equatorial regions being still in too thermal a state to enable them to do so.

Butterflies are, however, geologically speaking, of comparatively very recent origin, according to the evidence furnished by palæontology, and the place where they were first produced was most probably somewhere in the equatorial regions of the earth. Tropical America very likely constitutes the cradle of their birth, on account of the wonderful development they receive in this region both as regards numbers and variety. In the basin of the Amazon and adjacent countries to the north there exist about 5000 different species out of a total of 10,000 known to science, that is, 50 per cent. of the rhopalocerous fauna of the globe.

During the course of many thousands of years succeeding they became disseminated through all portions of the earth, and up to the commencement of the great glacial period there was probably a rich rhopalocerous fauna found in most parts of Europe. It is the influence of the above climatic conditions, as affecting the present distribution and diversity of the European Rhopalocera, with which I propose to deal in the present paper.

During the height of the glacial period, that is when the ice-cap attained to its maximum dimensions, the major part of Europe north of the Pyrenees, Alps, and Carpathians, was covered by a vast field of snow and ice, which accumulated to such an extent during the severe winters that the heat of each succeeding summer was unable to sublime it. The butterflies which had formerly existed in this area were either all extirpated or had been driven south to the edge of the ice-cap, where alone their pabula could survive. At this period all the countries bordering on the Mediterranean must have possessed a fauna and flora somewhat similar to that which now reigns supreme in Scandinavia at the present day.

Upon milder climatic conditions ensuing the ice-cap, which had previously enveloped Europe in its clutches like a gigantic cuttle-fish, gradually receded, carrying in its trail those butterflies and their food-plants which had continued to survive upon the southern edge of its area. Thus we find existing at the present day in high latitudes, and also at considerable altitudes upon mountains, where climatic conditions prevail parallel with those which existed during the glacial period, the most ancient forms of the various genera and species. These have in many cases since branched out into numerous other forms, under more favourable physical surroundings, in lower latitudes and at less elevated altitudes.

In the north, Scandinavia, Lapland, and Finland constitute the happy hunting-grounds of those who wish to meet with these ancestral forms; while further south they may only be obtained on the Alps and Pyrenees, and other mountain-ranges of Central Europe which are of a sufficient vertical elevation, and furnish zones with an equivalent vegetation to those now existing in arctic and subarctic regions.

When the major part of Europe was submerged beneath a sea of snow and ice, other large portions of the palæarctic area were left uncovered, at least were free from it in the summer time. This consisted of land even further to the north than the glaciated western continent, namely, in Siberia. The reason of this is, as has been ably demonstrated by Prof. A. R. Wallace, that in order to induce glaciated conditions a certain amount of humidity must occur, whereas this was absent in the region in question, as is evidenced by the non-presence of geological proof to the contrary, such as ice-scratchings, &c. At the same time the cold may have been much more intense in the winter, although in the summer, the land being free from snow, vegetation could make its appearance, together with the attendant butterflies. It is highly probable, therefore, that many species of the latter were perpetuated and survived within this area during the glacial period, which, upon more favourable climatic conditions making their appearance in Northern and Central Europe, spread westwards, and intermingled with those which at the same time advanced northwards from the south.

As the result of his investigations, Ernst Hoffmann asserts that of the 290 species of Rhopalocera inhabiting our continent at the present time, no less than 173 were originally derived from Siberia. If this was the case, and it seems very likely to be correct, the majority of them probably immigrated westwards at the commencement of the pleistocene period, for they must be of great antiquity; moreover, it is unreasonable to suppose that many of the species could not have existed also in the South of Europe, even at the climax of the glacial epoch. According to the same authority, only eight species have been derived from Africa and thirty-nine from Asia, south of Siberia; that is, the oriental region of Prof. Wallace. These must in all cases have immigrated into the south European province of the palæarctic region after the termination of the glacial period, as they belong to genera and types of tropical distribution. At the present day they occur in those countries bordering on the Mediterranean Sea.

The glacial species of butterflies—that is, the most ancient forms, designated by Prof. August Weismann, "the original stirps"—are in many cases distinguished by their melanic and melanochroic tendencies. We thus find the forms inhabiting the more northern localities and higher elevations on the mountains often of a darker hue, while their representatives in more southern latitudes and less elevated altitudes exhibit a brighter coloration. The researches of the learned German above named confirm this view, although in a few instances the reverse seems to be the case, the more austral forms exhibiting melanistic tendencies, while their representatives in boreal localities possess either a brighter or a more pallid coloration.

Without entering here into the discussion as to whether these melanic forms have been produced by the direct or indirect action of the local conditions, I think I may safely assert my belief that those belonging to the austral group owe their evolution to post-glacial times, and are consequently of much more recent origin.

The comparative paucity of the European rhopalocerous fauna is to be accounted for in two different ways. The first is that insufficient time has elapsed since the termination of the glacial period to permit of the appearance of many new species to replace those which were extirpated by the great cold. At about the climax of the glacial period, as Prof. James Geikie informs us, the land connection between Europe and Africa was severed, which resulted in the entire extinction of many species of a more austral character which were driven south, and survived for a time in the area which the Mediterranean now occupies. The second one consists in the great and insurmountable barriers to the immigration of austral forms, furnished by the elevated chain of the Himalayas and the vast sandy tract of the Sahara; otherwise, were these not existing, many oriental and ethiopian butterflies would no doubt extend the area of their distribution to the north, where they could easily find a congenial home on the shores of the Mediterranean.

As it is, on account of the absence of these austral species, the sunny South of Spain possesses fewer butterflies than Switzerland, while boreal forms exist in the latter, which are also unknown in the former locality.

At the present day the Alps, the Caucasus, and the Pyrenees constitute the richest hunting-grounds for Rhopalocera in Europe, for we here find many of the glacial species still existing, in addition to numerous post-glacial modifications in the valleys and on their southern slopes.

Birmingham, August 14th, 1895.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 217.)

Noctua sobrina, *Gn.*—Two specimens were taken at Clonbrock, Co. Galway, by the Hon. R. E. Dillon.

Noctua castanea, *Esp.*—Kilcornan (*B.*), and type and var. *neglecta* at Clonbrock (*R. E. D.*), Co. Galway. Both also occur at Markree Castle, Co. Sligo, and at Knocknarea (*R.*), but are scarce; Killarney (*B.*).

Noctua xanthographa, *Fb.*—Everywhere common and variable, grey forms predominating in many places. The var. *rufa*, Tutt, with well-marked stigmata, is not rare, and the unicolorous red form, which occurs at Castle Bellingham and about Belfast, &c. Var. *nigra*, Tutt, is occasional at Castle Bellingham, Co. Louth; Bundoran in the West (*W.*), and elsewhere.

Triphæna ianthina, *Esp.*—Everywhere distributed, and often common.

Triphæna fimbria, *L.*—Widely spread throughout Ireland, and of every grade of variation from the unicolorous pale buff forms to deep greenish-brown. Usually only an occasional species, but in some localities abundant.

Triphæna interjecta, *Hb.*—Decidedly a scarce species, though widely spread. I have taken it at Killiney and Howth, Co. Dublin; Kilcool and Arklow, Co. Wicklow; Cappagh, Co. Waterford; Minehead and Castlehaven, Co. Cork; Castle Bellingham, Co. Louth; Killynon and Cromlyn (*Mrs. B.*), Westmeath; Clonbrock, Co. Galway, two (*R. E. D.*). It sometimes flies rapidly in the afternoons in hot sunshine.

Triphæna orbona, *Hufn.* (*subsequa*, S. V., Hb.).—This has been taken in the Co. Galway as follows:—Near the town in

August, 1858 (*B.*); two at Ardrahan (*Harker*); two at Clonbrock (*R. E. D.*).

TRIPHÆNA COMES, *Hb.* (*orbona*, Fb.). — Universally common. Among its variations is one approaching the red Scotch form, but not, I think, of so deep a tint. This occurs at Howth; Sligo; Old Head of Kinsale, Co. Cork; Armagh and Coolmore, Co. Donegal (*J.*); also at Clonbrock with other remarkable forms (*R. E. D.*). The clay-coloured aberration is widely distributed and not infrequent.

TRIPHÆNA PRONUBA, *L.*—Everywhere very common, and in every grade of variation. Some of the finest of these I saw in great numbers at Toberdaly, King's Co. The var. *hœgi*, H.-S., occurs in Ireland, characterised by the apical lunule on the hind wing.

AMPHIPYRA PYRAMIDEA, *L.*—Apparently confined to the southern half of Ireland, where, as at Clonbrock, it is very abundant. But it is apparently very local. Abundant at Killarney (*B.*) and near Kenmare; and at Cappagh, Co. Waterford; not scarce about Glandore and Bandon (*L.*), Co. Cork; scarce at Moycullen, Connemara, but common elsewhere in the Co. Galway, as at Castle Taylor, &c. Athlone. It has occurred at Cromlyn rarely (*Mrs. B.*), and Killynon (*Miss R.*), where it became common in 1893. Single specimens at Howth (*G. V. H.*), and Lissadell, Co. Sligo, mark its northerly limits on the east and west coasts.

AMPHIPYRA TRAGOPOGONIS, *L.*—Everywhere common.

MANIA TYPICA, *L.*—In varying abundance in most localities.

MANIA MAURA, *L.*—Very widely spread from north to south, usually in scanty numbers. But in Kerry I have seen six at a time on the sugar; and at Castle Bellingham, Co. Louth; Corkhill, Co. Tyrone; and Castle Taylor, Co. Galway, it is also very numerous. I have not seen the pale typical form with very unicolorous ground colour in Ireland. Our specimens accord with Newman's fig. 710, with a dark median band.

PANOLIS PINIPERDA, *Panz.*—Not recorded by Birchall. A decidedly local species, probably introduced from British nurseries with fir plants, and, I think, extending its range in Ireland. There seems little doubt that the native pine tree became quite extirpated here in historical times; although extensive pine woods existed in many parts in the twelfth century, and more anciently it clothed great tracts of moor and mountain in every province; evidences of which are to be found in the lower strata of most of our bogs. The only alternative supposition seems to be that in default of fir the larva may be able to support itself on other food. Certainly the insect has been sometimes captured at great distances from any species of pine. The common form is of a bright brick-red, but specimens occur of a dull brownish tone of red, and I have taken one or two rather grey forms at Clonbrock. Localities:—Ashford, Co. Wicklow, one (*Talbot*); Agher, Co. Meath, a few (*Miss R.*); near Galway (*Lieut. Walker, R.N.*), and not scarce at Mount Bellew, and plentiful at Clonbrock in the same county. In the Co. Dublin a few at Howth (*G. V. H.*), and Tibradden one (*Halbert*); Kilderry, Co. Derry, one (*G. V. H.*); Sligo a few (*McC.*).

Pachnobia rubricosa, *Fb.*—This common British moth is rather scarce in Ireland, occurring for the most part very sparingly. The ruddy brown type seems the predominant form here, but greyer ones also occur both in the south and north. The var. *pallida*, Tutt, which seems chiefly confined to North Britain, I have taken with the type at Killarney, and Mr. McClean at Sligo; var. *rufa* also occurs at Sligo and at Clonbrock; var. *mucida*, Esp., at Kilderry, near Derry (*G. V. H.*). Localities:—Occasional specimens in Co. Wicklow (*Bw.*), and by myself at Powerscourt; Wooden Bridge (*M. F.*); Bray Head, larvæ feeding on seed-pods of wild hyacinth (*A. G. More*); Tempo Manor, Enniskillen, one (*Langham*); Farnham, Cavan; Favour Royal, Co. Tyrone. Not scarce at Markree Castle and L. Gill, Co. Sligo; and Clonbrock, and Mount Bellew, Co. Galway. At Killarney I captured once a long series on a sallow on the margin of a bog, and Mr. Hart found them abundant in a similar situation near Derry, where Mr. Campbell notes them generally as scarce. Ballycastle, Co. Antrim, abundant (*Bw.*).

Pachnobia hyperborea, *Zett.* (var. *carnica*, Hering).—A single example of this mountain insect emerged on Feb. 29th, 1893, in a cage placed in a warm sitting-room at Clonbrock, Co. Galway, and was noted in the Hon. R. E. Dillon's diary at the time as "probably *hyperborea*." He presumed it to have been the result (among others) of collecting larvæ in the preceding autumn at a large bog in the vicinity, where I find *Empetrum nigrum* grows plentifully. This part of the County Galway is flat with extensive ranges of bog, and though at only a very moderate elevation above the sea, is remarkable for preserving representatives, often in profusion, of many distinctively mountain plants.

Tæniocampa gothica, *L.*—Universally common and extremely variable. In some localities, as at Drumreaske, Co. Monaghan, and Clonbrock, specimens with red ground are numerous. At Killarney, where many northern species and varieties are found, I took a few specimens of var. *pallida*, Tutt, which may be ranked in that category. Herrich-Schäffer's var. *gothicina* (in which the black *gothica* mark is suppressed) has occurred at Killarney, Clonbrock, and elsewhere occasionally. At the latter locality a specimen of var. *suffusa*, Tutt, is worth record. Var. *rufescens*, Tutt, Westmeath, &c., rare.

Tæniocampa incerta, *Hufn.*—Universally distributed, but generally much less common than either the preceding or *stabilis*. The dark forms, such as var. *fuscatus*, Haw., are usually the most plentiful; and next in abundance those with warm brown ground colour. Specimens of the true var. *instabilis*, Hb., of the colour of *P. rubricosa*, with a dark band, are taken at Drumreaske, Monaghan; but it is an uncommon form. Those with various tones of grey with or without a median band are rather scarce. At Clonbrock Mr. Dillon takes a very handsome mottled bluish grey variety in some numbers, which appears referable to var. *cærulescens*, Tutt. It appears restricted to a small area in its occurrence at Clonbrock. The var. *instabilis*, Fb. (as quoted in Tutt's 'British Noctuæ'), with greyish wings and waved ferruginous median band, I have very rarely seen. Westmeath, and Sligo (*McC.*).

Tæniocampa opima, *Hb.*—A very local species, first noted in Birchall's 'Supplement,' 1873, taken by Mr. Talbot at Tarbert, on the south shore of the Shannon estuary. Many years after a specimen fell to my net at Killynon, Westmeath. Lately it has been taken pretty numerously at Clonbrock, Co. Galway; and occurs at Castle Bellingham, Co. Louth (*Thornhill*), and near Belfast (scarce, *W.*). Besides the pale grey type with median band varying in depth of colour and breadth, a considerable proportion of brown forms, with antemarginal line and outlines of stigmata paler (var. *brunnea*, Tutt), are found at Clonbrock and Castle Bellingham, some being as dark as any North of England specimens I have seen. Intermediate forms of greyish brown are not uncommon—var. *intermedia*, Tutt.

Tæniocampa populeti, *Fb.*—"Wicklow and Killarney" (*B.*). A *Tæniocampa* possibly referable to this species, but since lost, was taken near Derry by Mr. Campbell. Two at Clonbrock, Co. Galway (*R. E. D.*).

Tæniocampa stabilis, *View.*—Usually the commonest of this genus, though in some districts *gothica* supersedes it. Every known variety appears to exist here, with ground colour ranging from pale whitish grey to various tones of brown and red. Often a median shading is present, and strongly marked but suffused, and many examples have the stigmata extremely large and sometimes adherent. (Var. *juncta*, Haw.) I do not know of any form peculiar to Ireland.

Tæniocampa gracilis, *Fb.*—This species is represented in almost every locality I have any experience of, but usually in sparing numbers. On the other hand it sometimes, as at Clonbrock, is extremely numerous, and turns up in dozens. Like *opima* it is rather later in emergence than most of its congeners, and straggles on till almost summer. The almost unicolorous creamy-white var. *pallida*, St., is, I think, the most widely distributed form; but var. *sparsus*, Haw., which is more or less speckled with black scales, is occasional in some localities,—Clonbrock; Drumreaske, Monaghan; and Favour Royal, Tyrone, &c.,—and is the local type at Enniskillen (*teste* Capt. Browne, who has also taken an extreme form of it there). Var. *pallida*, Gn. = *rosea*, Tutt, I met with at Clonbrock. The dark reddish var. *rufescens*, Ckll., is very rare; I have seen a few taken by Mr. Dillon, and one from Leenane in the same Co. (*A.*), but the colour is rarely so deep as those from the New Forest.

Tæniocampa miniosa, *Fb.*—The few Irish specimens hitherto taken belong to the var. *rubricosa*, Esp., being of pale reddish ground colour with a well-marked red median band. I have met with it at Howth and the Wooden Bridge, Co. Wicklow, where also Mr. Fitzgibbon took a specimen in 1892. One was recorded from Ashford, in the same county (*Talbot*, 1877). A few bred this year at Clonbrock, Co. Galway (*R. E. D.*).

Tæniocampa munda, *Esp.*—The distribution of this local moth in the northern half of Ireland seems to be pretty wide; but Birchall's original record of "Killarney" is the only one yet available from the south. The range of variation seems to be as wide as in Great Britain, but I have seen none of very red ground colour. The following tints occur:—Pale grey, similar to *Xylina socia* (var. *pallida*, Tutt); dingy speckled grey (? var. *grisea*, Tutt); pale ochre (type); warm buff (? *rufa*, Tutt); dingy brown. Of these forms, with their varied designs of marking, perhaps the most striking is the last; of which I have specimens with slightly marked ante-marginal dashes, and a very broad suffused median band, and other waved transverse linear markings in darker tone. The most unicolorous example I have is of a warm buff ground, with only the reniform stigma and two almost obsolete ante-marginal dashes (var. *bimaculatus*, Haw.). The median band is usually obsolete or nearly so in the paler forms. Localities:—I have met with a few specimens at Arklow and Wooden Bridge, Co. Wicklow; Dr. Hart, one at Howth. It is not scarce at Castle Bellingham, Co. Louth (*Thornhill*); at Drumreaske, Monaghan; and on the verge of the Co. Tyrone at Favour Royal. Single examples were taken at Tempo Manor (*Langham*), near Enniskillen (near which town a series has also been caught by Capt. Browne); at Hollybrook (*Miss ff.*) and Markree Castle, Co. Sligo; Farnham, Co. Cavan (*Halbert*); and a few at Clonbrock, Co. Galway (*R. E. D.*).

(To be continued.)

NOTES AND OBSERVATIONS.

Why not collect Tortricina?—In discussing the above question, Mr. South (*ante*, p. 215), while praising the portion of Stainton's 'Manual' allotted to this group, desiderates a new work upon it. Please allow me to extend the question to the collection of the Tineina, as well as the Tortricina, and to suggest that what is imperatively needed at this moment is a new edition of the 'Manual,' so far as it treats of these two most interesting groups, *i. e.*, vol. ii., pp. 188–439, brought up to date. A work of this kind ought not to be a difficult one. I could name many of our collectors, who are not *collectors* merely, but are well up in the scientific part of the subject, to whom it should be a "labour of love." It is probably hopeless to expect figures of every species, but a typical one of each genus might be given, or, in genera of considerable extent, several. Plain figures well lithographed would be best, though woodcuts (of the first excellence) sufficiently enlarged for the minute species, and intercalated in the text, would be perhaps most convenient. These with short Staintonian diagnoses, and differential tables of species, keeping as close as may be to Mr. Stainton's method, would be a priceless boon to collectors. The systematic arrangement might be that of Mr. South himself. This arrangement is, I believe, now generally followed and accepted by British collectors. For the greater utility of such a work I have little doubt but that almost all collectors would gladly furnish data of localities, abundance or scarcity, or any other facts that may have come within their cognizance. I trust the above suggestion may be taken up and acted upon. — (Rev.) O. P. Cambridge; Bloxworth Rectory, August 3rd, 1895.

Polyporus for Staging Insects. — I can heartily recommend the white birch fungus (*Polyporus betulinus*), not only for staging insects, but for many other purposes as well. I first discovered this substance and used it for staging purposes nearly twenty years ago, and called attention to it in the 'Canadian Entomologist,' vol. x., page 83. I soon after learned, however, that it had long been known and used for that purpose in Germany, and it may have been in other parts of Europe. It is not for sale in this country, since so few work on the Micro-Lepidoptera here that there is not much demand for it. North America is as yet a glorious country for those suffering with the "mihi itch."—C. H. Fernald; Amherst, Mass., August 12th, 1895.

Further Note on Acronycta psi.—With reference to my note (*ante*, p. 229) concerning the larvæ of this species, the second larva spun up (like the previous one) on the surface of the earth, on July 13th, and yesterday (20th inst.) I found that it had turned to a pupa, which seems quite healthy. I might mention that the reason for both spinning their cocoons on earth is due to there being no other convenient method, as the cage is covered by an inverted tumbler.—A. E. Allworthy; 5, Gladsmuir Road, Whitehall Park, N., July 21st, 1895.

What Species of Insects are the most Variable? — Were I asked this question, I should answer, *Arctia caia*, *Abraxas grossulariata*, *Cidaria russata*, *C. immanata*, *Peronea cristana*, *P. hastiana*, and *Cerostoma radiatella*, amongst the Lepidoptera; *Coccinella variabilis*, *C. bi-*

punctata, *Donaria sericea*, and *Harpalus proteus*, amongst the Coleoptera *Ptyelus spumaria* and *Bysthoscopus flavicollis*, amongst the Homoptera *Chrysis ignita* and *Bombus muscorum*, amongst the Hymenoptera.—C. W. Dale; Glanvilles Wootton, August 1st, 1895.

Hermaphrodite of Pieris napi, var. bryoniæ.—I recently took a specimen answering this description on the Gemme Pass, in Switzerland, the right fore wing of which is that of a typical male, the other three resembling those of a female of the alpine variety *bryoniæ*. — W. Harcourt Bath; Birmingham.

Entomological Expedition to the Alps.—I have recently undertaken a very successful collecting trip to the Pennine and Bernese Alps and Jura. In the course of a fortnight I netted about 1500 specimens of Rhopalocera, representing nearly 90 species, full particulars of which I hope to publish in the 'Entomologist' later on.—W. Harcourt Bath; Birmingham, August 1st, 1895.

"Newspaper Entomology." — To a specialist of any class a newspaper will always appear inaccurate; and we cannot help feeling that Mr. James's attempt to pillory the writer of an unsigned letter to an evening paper, which any one can see for himself in a dozen public places, rather misses its mark, and recoils upon its author. Who the "moderate collector" may be I know not, but, whoever he is, he has been unfairly treated by Mr. James. The entomological mistakes referred to by the latter are, on the very face of the letter, not those of the writer, but of other parties. These mistakes are not endorsed by the writer, and it would have been foreign to the object of his letter to correct them; that object, it is plain, was the very admirable one of calling attention to the injury done by mere collectors, who can see nothing in an insect until it is skewered with a pin, and by semi-scientists, to whom an insect, like every other natural object, is simply a thing to be classified, and, once classified, of no further use. The writer's suggestion as to the protection of rare insects is not only not absurd, but interesting and useful. It would not be difficult to show that it is not unpractical. The honour of the entomological brotherhood requires that something be done to check the destruction of rare and local insects by dealers and "omnivorous" collectors, to adopt the "moderate collector's" apt description. That I may not be thought to be out of sympathy with "collecting" in a true, and, if I may apply the term that best expresses the feeling, sportsmanlike sense, I may mention that I have myself been a collector of insects as long as I can remember. I believe I began collecting before I could talk.—Harold Hodge; 2, Essex Court, Temple, E.C.

CAPTURES AND FIELD REPORTS.

Plusia moneta at Reading.—I have great pleasure in recording the capture of a fine specimen of *P. moneta*, which came to light in my house on July 14th.—H. S. Morris; 5, Southern Hill, Reading, Aug. 16th, 1895.

Plusia moneta near Tunbridge Wells.—This is the third season now I have had the pleasure of breeding this species, from the same locality each season. I have searched for it very much this year, but have not found it outside of its former haunts, which shows it is getting more restricted in habits. Some of the larvæ I found were very small. Before the first change it is a very different-looking larva, being then speckled all over with black dots, which caused me to think at first I was to be the fortunate captor of that lost species *P. illustris*, as the description of that species in Stainton's 'Manual' corresponded exactly; but after the first change it came to its normal colour. I believe this has not been noted before.—M. M. PHIPPS; Victoria Road, Southborough, Tunbridge Wells.

SPHINX PINASTRI IN SUFFOLK.—We have taken fifteen *Sphinx pinastri* (imagos) here this year, and could have taken more. This makes the fourth year out of five we have taken them here, but for the first time we have beat the larvæ of the species, thus proving beyond all doubt that it lives and breeds here. I have about one hundred larvæ feeding now.—F. MELLUSSON; Rendlesham, Woodbridge, August 2nd, 1895.

CŒNONYMPHA TYPHON (DAVUS) IN DELAMERE FOREST.—I am pleased to note the discovery of three new localities in the Delamere Forest district for this interesting butterfly. In its old habitat it is evidently extinct; but, in the first of the three new localities, a fine specimen was netted on June 22nd, and several in the second on the same day. This reminded me I had marked, some miles away, last autumn, a likely-looking spot for the butterfly, and I was rewarded by taking six very fair specimens (four rather rubbed and chipped) on the 29th. The Delamere form of the butterfly belongs to the variety *philoxenus* = *rothliebi*. The eye-spots vary much in number and size; there is much variation, as well, in the whitish bars, streaks, and patches on the under surface of the wings. Underneath each lower wing there are usually, if not always, six ocelli, varying, in the case of the largest, from a tenth to the twentieth of an inch. Can any one say what is the form of *C. typhon* between the Clyde and the Forth, on the one hand, and the Cheviots, on the other? The Irish form—disregarding inconstant minor differences—seems to be the same as that in England and Wales.—J. ARKLE; 2, George Street, Chester.

COLIAS EDUSA IN KENT.—On July 7th I took a fine male specimen of *C. edusa* in an orchard near here, and since then have captured two others and one female. — H. W. SHEPHEARD-WALWYN; Glensyde, Bidborough, Tunbridge Wells.

VARIETY OF GONOPTERYX (RHODOCERA) RHAMNI. — On July 15th I took a fine male *G. rhamni* with the left primary sprinkled with orange spots.—H. W. SHEPHEARD-WALWYN.

PERIPLARETA AMERICANA IN KEW GARDENS.—I should like to record the capture of a specimen of this cockroach on April 23rd. Though common about docks in English sea-port towns, it is, at present at any rate, seldom met with inland.—W. J. LUCAS; St. Mary's, Knight's Park, Kingston-on-Thames.

CAPTURE OF MALLOTA CRISTALOIDES, *Loew*.—On July 18th, 1880, I captured in the window of my study an Eristalid kind of large fly, which baffled all attempts to name, although I submitted it to the late Professor Westwood, Mr. Verrall, and the Natural History Museum authorities at South Kensington. However, this year I found a similar specimen in the

Museum under the above name, taken last year in the New Forest by Mr. Adams.—C. W. Dale; Glanvilles Wootton, August 1st, 1895.

Collecting at Dover.—*Colias edusa*, South Foreland meadow; one specimen reported to me; I have not seen it this year myself. *Pamphila sylvanus*, abundant. *P. linea*, about six taken. *Pieris brassicæ*, fairly common. *P. rapæ*, only two or three seen. *Satyrus ianira*, *Cœnonympha pamphilus*, and *Melanargia galatea*, very abundant on the East Cliff. *Lycæna alexis* and *L. alsus*, very sparingly; both species worn. *L. ægon*, a few; good condition. *L. corydon*, just coming out; condition fine. *L. adonis*, second brood not yet appeared. *Vanessa cardui*, one or two seen; worn. *V. urticæ*, a few hybernated and worn; this year's specimens just coming out (July 18th). *Acherontia atropos* and *Smerinthus ocellatus*, one specimen each (brought me by the boatmen: captured close to electric-lamp, Marine Parade, East Cliff). *Macroglossa stellatarum*, three or four noticed round viper's bugloss, East Cliff; captured there by others. *Zygæna filipendulæ*, swarming on downs; the earliest emerged, as far as I can tell, simultaneously with the 1st of this month. *Chærocampa porcellus*, said to occur on viper's bugloss, and has been found this season; I have not come across it myself.—F. A. Walker; 2, Eastbrook Place, Dover, July 20th.

Notes from Dorset.—Yesterday morning, on a hedge in a field here, I caught a battered specimen of *Thecla betulæ;* and later on my brother saw a butterfly, which I think was *Colias edusa*, but as it was not caught I am not quite sure; it looked rather pale, so may have been var. *helice* or *C. hyale*.—W. H. Somerset; Sydney Villa, Sherborne, Dorset, Aug. 16th.

Notes from New Forest and Epping Forest.—I have just returned home disappointed from a two days' stay at Brockenhurst. Never before have I known such an absolute dearth of moths for the time of year, beating, treacling, and dusking alike proving almost a dead failure. Rhopalocera were more plentiful, but still far below their usual numbers; *Argynnis paphia* was fairly common, and still in pretty good condition, half-a-dozen good *valesina* among them; *A. aglaia* and *A. adippe* very scarce, *Limenitis sibylla* very worn, and although *Gonopteryx rhamni* and *Vanessa polychloros* were in grand condition they were distinctly rare. The Satyridæ, which were plentiful, although not in their usual countless numbers, were principally composed of *Epinephele ianira*, *E. hyperanthus*, and *E. tithonus; Pararge egeria* was seldom seen, and *Satyrus semele* not too common. The latter species was frequently disturbed from the pine trunks in the enclosures, this being the first time I have noticed it in the New Forest away from the heathland; *Thecla quercus* was hardly out, only four specimens being seen. One *Leucania turca* and twelve other moths of the very commonest description made up the sum total of three nights' treacling, and beating went along at about the same rate. Of *Acidalia aversata*, which was undoubtedly the commonest species, I certainly did not see a dozen, and the rest could pretty well be counted up on the fingers, a male *Boarmia abietaria* and a female *Eugonia erosaria* being the only ones worth mentioning. A fair number of *Eubolia palumbaria* and one *Pseudoterpna cytisaria* from the heath, one *Ellopia fasciaria* from a pine trunk, and one *Caradrina blanda* complete the scantiest list I have ever known or heard of from the New Forest in July. The local collectors all say it is the worst season they remember. This utter failure came as a greater surprise after my experience of Epping Forest at the end of June. I spent two short evenings (June 24th and 27th) at Chingford, and if nothing very good was taken common species were swarming both at dusk and treacle. Although I had to leave each night as early as 10 o'clock, no less than twenty-nine species turned up on treacle, including three *Dicycla oo* (one of them a lovely clouded variety), *Thyatira batis*, *T. derasa*, *Xylophasia hepatica* (abundant), *Caradrina blanda*, *Rusina tenebrosa* (common), *Noctua festiva* (some very nice forms), *Aplecta nebulosa* (dark), and *Hadena thalassina* (very worn). At dusk seven *Phorodesma bajularia* were taken during a quarter of an hour on the 24th (which was all the time I had for dusking that evening), and another on the 27th; *Angerona prunaria*, males, were fairly common, *Hemithea thymiaria* and *Cidaria fulvata* abundant, and *Melanthia bicolorata* in such vast swarms as I have never before seen. On the whole, when comparing these two evenings with the two days spent at Brockenhurst three weeks later, one could scarcely imagine that it was the same season. Moreover, according to Mr. Gulliver, treacle had been no more successful in the New Forest during the last week of June (when it was so attractive in London) than I found it in July. The question of the success and non-success of treacle still seems to be far from satisfactorily settled, as the Brockenhurst evenings could not possibly have been more promising from the weather point of view, whilst the Chingford evenings were two of the brightest and clearest we have had all the summer, and at the same time there was a great quantity of "honey-dew" about on the foliage.—Russell E. James; 3, Mount View Road, Finsbury Park, N., July 22nd, 1895.

SOCIETIES.

South London Entomological and Natural History Society.—*July* 11*th*, 1895.—Mr. T. W. Hall, F.E.S., President, in the chair. Mr. Fremlin exhibited a long and variable bred series of *Phorodesma smaragdaria*, Fb., all of which were set with the aid of a blowpipe; also a bred series of *Geometra papilionaria*, L. Mr. Oldham, a *Sirex gigas*, L., from Wisbech, and a number of Lepidoptera taken during the Society's field meeting at Oxshot, June 29th, including *Eurymene dolabraria*, L., *Macaria liturata*, Clerk., and *Hadena pisi*, L. Mr. Adkin, a yellow var. of *Ematurga atomaria*, L. Mr. T. W. Hall, a pupa of *Sesia sphegiformis*, Fb., and a bred series of *Eupithecia valerianata*, Hb. Mr. Edwards, a specimen of *Papilio sesostris* var. *xestos*, from S. America.

July 25*th*.—The President in the chair. Mr. Hall exhibited a long variable bred series of *Dianthœcia carpophaga*, Bork., the larvæ having been found on *Lychnis vespertina*; one specimen had all the usual markings nearly obliterated, and gradations led to the opposite extreme of a specimen with the markings much extended and intensified. Mr. Robson, a var. of *Smerinthus tiliæ*, L., without the usual dark band across the fore wing, and an exceedingly pretty suffused form of *Zonosoma pendularia*, Clerk. Mr. Dennis, a bred series of *Cosmia affinis*, L., from Horsley. Mr. Turner, a series of *Lycæna ægon*, Schiff., from Oxshot, showing amalgamation of spots on the under sides, blue-splashed females, and one female undistinguishable on the upper side from *L. astrarche*.

August 8th.—The President in the chair. Mr. T. W. Hall exhibited specimens of *Hadena oleracea*, L., in which the reniform and orbicular stigmata were scarcely to be traced. Mr. Adkin, a series of strongly-marked *Eupithecia tenuiata*, Hb., from Drogheda. Mr. South, a number of series of species taken near Macclesfield during the present season, including four forms of *Xylophasia rurea*, Fb.; all forms of *X. monoglypha*, L., except the very dark Durham form *Miana strigilis*, Clerk., were all dark, not a single type specimen having been seen; and two series of *Hepialus velleda*, Hb., with var. *carnus*, taken at different elevations. Mr. A. E. Hall, a specimen of *Argynnis adippe*, L., var. *cleodora*, Och., and a remarkable *Triphæna comes*, Hb., with intense black markings. Mr. Moore, a specimen of *Epinephele ianira*, L., with a considerable increase of the fulvous area; and an Orthopteron of the genus *Petasia*, from S. Africa. Mr. Frohawk, a grand series of under sides of *Epinephele hyperanthus*, L., showing all gradations from var. *arete*, Mull., to var. *lanceolata*. Mr. Turner, a var. of *Euchelia jacobææ*, L., with a small additional spot, and other Lepidoptera.—H. J. Turner, *Hon. Report. Sec.*

Birmingham Entomological Society.—*July* 15*th*, 1895.—Mr. P. W. Abbott, V.-P., in the chair. Mr. B. C. Bradley referred to the fungus-killed *Melanostoma scalare* shown at the last meeting; he had sent specimens to Mr. M'Lachlan, who said the fungus was *Empusa conglomerata*, a species found in America and Germany on Tipulidæ, but not hitherto found in Britain. Mr. Wainwright said he had found several lots at Sutton on grass-heads and dock-flowers, and one specimen on *Equisetum;* he had also taken specimens which developed the fungus on the way home. Mr. Martineau had observed a specimen at Bridgnorth on the wing, with the fungus well developed. Exhibits:—By Mr. Wainwright, *Therioplectes tropicus* var. *bisignatus* from Sutton, together with a specimen of the type from near Stroud. By Mr. Abbott, a number of moths from Wyre Forest at Whitsuntide—*Macroglossa bombyliformis*, *Cymatophora or*, *C. duplaris*, *C. fluctuosa*, *Acronycta ligustri*, *Tephrosia extersaria*, *Asthena blomeri*, and others. By Mr. G. H. Kenrick, *Hadena genista* from Kingswood; also *Nola cristulalis*, *Melanippe hastata*, *Macroglossa bombyliformis*, and other Lepidoptera from Coombe Wood near Coventry. By Mr. Martineau, *Chelostoma florisomne*, *Hippobosca equina*, and other insects, taken by Mr. Chase in the New Forest at Whitsuntide. By Mr. Bradley, *Helophilus transfugus* and *H. frutetorum* from Sutton Park: Mr. B. remarked the unusual abundance of the genus this year; he had taken good series of both the above, while previously he had never taken *transfugus*, and only odd *frutetorum*.—Colbran J. Wainwright, *Hon. Sec.*

Nonpareil Entomological Society.—A meeting was held on the 17th inst. at 'King John's Head,' Mansfield Street, Kingsland; Mr. T. Jackson, President, in the chair. Lepidoptera were exhibited by the following members:—Mr. W. Harper, Mr. Gurney (*Dicycla oo* from Chingford this year), Mr. Huckett, Mr. Lusby, and Mr. Jackson. Meetings of the Society are held on the first and third Thursdays in each month, at 9 p.m.

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OBSERVATIONS ON *PLUSIA MONETA.*

BY J. C. RICKARD.

IN the early part of September, 1890, I found a specimen of this moth on a brick-wall (near a street lamp) in a central part of the town; since that time I saw no more of the species until May 28th of the present year, when I found one larva and three pupæ, on the following day three more pupæ, and on June 3rd another larva just beginning to spin up; seven moths emerged from these on the following dates: June 8th, 12th, 13th, 15th, 19th, 24th, and 29th; the eighth pupa dried up. On June 29th I netted one specimen, one on the 30th, and another on July 10th. I placed the one taken on June 30th with some monkshood under a glass shade, where it lived for about a week, during which time it deposited a number of ova, either singly or in groups of three or four; between thirty and forty of these hatched on July 11th, and were supplied with fresh food from time to time. Not seeing anything of the young larvæ, I made a minute search, with the result of finding five or six very small larvæ, one about a quarter and one about half an inch in length; the two larger were "oil-green" in colour, with numerous black spots (see *ante*, p. 257), superficially resembling the larva of a sawfly of the genus *Nematus* more than any larva I am acquainted with. On August 4th the largest one had formed a slight web of whitish silk between two portions of a leaf in which to undergo its last moult; on the 9th I noticed it was feeding again, but at this stage its colour was bright yellowish-green, with indistinct whitish spiracular lines, and without a trace of the black spots; at all stages of growth the larva had a considerable number of scattered hairs. On the 11th it commenced to spin, and the imago emerged on the 29th; thus passing five to ten days as ova, thirty-two days as larva, and eighteen days as pupa.

I feel almost certain that the larvæ are cannibals; excepting the one just mentioned they all disappeared; a minute search failed to discover any dead ones, and as the glass shade stood on a white cloth the smaller ones would have been easily detected, to say nothing of one a quarter of an inch long. The fact that the ova are deposited either singly or in groups of three or four, and also the fact of the half-grown larva forming a web for its protection whilst undergoing its moult, seem to be confirmatory evidence.

The cocoons are nearly as yellow as those of *Bombyx mori;* they are placed on the under side of a leaf of the food-plant without bending or warping it; the central part (that opposite the back of the caterpillar) is left open until the other parts are nearly completed, and is then closed up; the pupa remains visible owing to the thinness of the walls. When the imago emerges it does not cut or burst its way out as does *B. mori* and many other species; but there is a horizontal slit or opening at the end of the cocoon which yields to the pressure from within, and closes again when the moth has escaped, scarcely a fibre of silk being displaced, or the slightest stain visible to indicate that it has left its temporary shelter.

The imago during the day is sluggish, and will not readily use its wings; the principal points that attract attention are—its large curved palpi, its large and curiously formed thoracic crest, long legs, and the very acute angle made by the wings in repose.

The species is double-brooded, but the only example of the second brood that I know to have been taken in the wild state is the one mentioned above as caught by myself in September, 1890. Mr. Mathew and Mr. Phipps seem to have reared and perhaps taken specimens of the second brood, and, as just noted, I had one emerge from the pupa on August 29th. Of those of which I have notes of capture, one was taken in May, thirteen in June, nineteen in July, and one in September.

So far as is known at present, the distribution of *P. moneta* in Great Britain is strictly confined to the south-easterly part of England, the neighbourhood of Tunbridge Wells being its headquarters. In Kent 16 have been procured, and many others bred or captured by Mr. Mathew and Mr. Phipps; Surrey, 8; Sussex, 1; Hampshire, 2; Berkshire, 4; Middlesex, 2; Cambridge, 13; Norfolk, 1; total 47. There does not appear to be any recorded from Essex, Suffolk, or Hertfordshire, which leaves a rather large gap between Norfolk and Cambridge localities and the more southern counties.

Halifax Road, Cambridge.

PRODUCTIVENESS OF *COLIAS EDUSA*.

By F. W. Frohawk, F.E.S.

On August 25th last I captured a fine and apparently freshly-emerged female of *C. edusa*, which I at once boxed alive for the purpose of obtaining ova. The following notes of the deposition of the ova may be of interest.

The next morning (August 26th) I fed the female with sugar and water, and confined her on a growing plant of clover; but the entire day was so dull, without a single gleam of sunshine, that she remained motionless the whole time. 27th.—Dull until 4 p.m., when the sun began to shine, which at once caused the butterfly to become very lively, and she deposited a few eggs. 28th.—A bright sunny morning; she was early on the move and busy depositing; by 9 a.m., when I again fed her, I found about 30 eggs were laid; the day remaining hot and sunny, she had by the evening deposited about 100 eggs. 29th.—I placed her upon a fresh plant; during the day between 70 and 80 more eggs were laid. 30th.—Fed her again; after a good feed and the hot bright weather she was induced to deposit between 50 and 60 more eggs during the day. 31st.—Fed again, and put her on another plant, and 50 more were laid.

Sept. 1st.—Fed again, and she produced 50 more eggs. 2nd.—Another big drink at the sugar and water, and another lot of 80 eggs were deposited. 3rd.—She was again supplied with a fresh plant and a feed, and the new addition of eggs again reached 50. 4th.—Fed again, and another lot of 24 eggs were laid. 5th.—She died without further depositing; when I opened the abdomen I found it quite empty; not a single egg remained.

Therefore, from the fresh condition of the specimen when captured, she had in all probability not commenced depositing; so that undoubtedly the full complement, numbering at least 480, were laid in confinement. I think 500 would be nearer the total number laid, as I am certain many were hidden from view at the time of counting each lot of eggs on their respective plants; I counted them each morning and evening; those of the previous day, having changed colour from whitish to pink, readily denoted the day of deposition.

The larvæ commenced hatching Sept. 3rd, remaining only seven days in the egg state, the short duration being influenced by the hot sunny weather since the 27th August. They are now feeding, and many are in the second stage.

All the eggs proved fertile, showing that one pairing is sufficient to fertilize the entire number of ova of this species, which is undoubtedly all that is necessary in most species.

Balham, S.W., Sept. 14th, 1895.

SUGAR *versus* NATURAL FOOD.

By F. C. Woodforde.

This season has been in this neighbourhood an unusually good one for sugar; and also, I think, a very instructive one with respect to the amount of attraction sugar has for moths. Ever since the end of the great frost of February and the early part of March, moths have been unusually abundant. In the third week of March *Hybernia leucophæaria* and *Phigalia pedaria* were most abundant; and I succeeded in taking between twenty and thirty *Nyssia hispidaria*, seven being females, on the trunks of trees. The sallows were fairly productive, but the weather during the season of their bloom was frequently unsuitable. At the end of April, while hunting for pupæ of *Sesia culiciformis* in birch stumps, I came across two pupæ of *S. sphegiformis*, but both died before the time of emerging. The larvæ of *Aplecta tincta* were very abundant during April on the birches, and one evening I collected over seventy in less than an hour and a half.

During May Geometers were abundant; and on May 28th I tried sugar for the first time, taking *Dipterygia scabriuscula* (1), *Thyatira batis* (1), *Hadena thalassina*, and *Acronycta rumicis*. An account of our success at sugar on June 1st, 3rd, and 4th, written by my friend Mr. E. W. H. Blagg, appeared in the July number of the 'Entomologist.' During Whit-week the weather was very warm, with occasionally heavy showers of rain, and sugared trees were literally covered with moths; but on Monday, June 10th, a cold spell set in, with almost frosty nights, and, as a matter of course, nothing appeared on the sugar at all. The change was most striking, after the swarms of the previous week. The week commencing June 16th was warm and fine, and I started on Monday night in full hope of filling my boxes, but to my surprise hardly a moth came to sugar. They were flying about in swarms, but the sugar seemed to have lost all its attraction. Some clumps of seedling aspens, from three to four feet high, seemed a favourite haunt; and on examining them the next day I found the upper surface of the leaves covered with honey-dew. There was no aphis this year, and these seedlings were in the open, not exposed to droppings from higher trees. Aphis of course is one great source of honey-dew, but could not be the source in this case. I cannot help thinking that the cold nights of the previous week had injured the delicate cuticle of the young leaves, and that the sap had exuded through the injured surface, thus forming what is called honey-dew, and providing natural food for the insects. The oaks seemed not much affected, and their leaves were almost entirely free from exudation, though a few of the younger leaves had in places a little on them. All through the week it was the same; with fine days and warm nights not a moth came to sugar. At flowers in the garden *Plusia iota*, *P. pulchrina*, *P. chrysitis*, *Dianthœcia capsincola*, and *Cucullia umbratica* were numerous, and one *P. festucæ* was taken; while *A. tincta* and others were abundant, flying over the aspens in the wood.

This state of things lasted till the 27th, when heavy showers again fell, which washed all the honey-dew off the leaves. On the 28th I tried sugar again, and moths swarmed at it:—*A. tincta* (some fresh, others very worn), *A. herbida* (quite fresh), *Acronycta leporina* (2), *Hadena gemina*, *Agrotis exclamationis*, *Leucania comma*, *Acronycta rumicis*, *Noctua augur*, and *N. triangulum* (3). This was repeated on the 29th. Then after three or four dry days the honey-dew again appeared, and sugar became useless. And so this has gone on up to the middle of August. After rain sugar has been most attractive, while two or three dry days have rendered it again almost useless. *Orthosia suspecta* swarmed in July on good nights; *Cleoceris viminalis*, abundant (some very dark); *Miana strigilis* var. *æthiops* and *Apamea didyma* (mostly dark brown or black), swarming; a few *Hydrœcia nictitans* and *Triphæna fimbria*; and on two very still, dark nights fourteen and eighteen *Hypenodes costæstrigalis*, respectively, were taken.

During August, up to the 19th, *Noctua neglecta*, *N. dahlii*, *Calocampa solidaginis*, and *T. fimbria* were numerous at sugar, with an occasional *H. costæstrigalis*; but after the 21st, although *C. solidaginis* was fairly numerous, the others left off coming. The ling had then come into bloom, and during the rest of the month all the above, except *T. fimbria* and *H. costæstrigalis*, were to be found on the ling flowers, with, in addition, a few *N. glareosa*. On many nights in July and August from 70 to 100 moths on a tree was a by no means uncommon sight. I could not observe that fruit essences at all increased the attractiveness of the treacle, and I found methylated spirit quite as effective as rum.

Natural food has been scarce this season. There has been no aphis, for one thing; and, for another, the honey season has been very bad here. In spite of the fine hot weather of May and June, the bees have collected very little honey, and are now feeding greedily on fallen fruits, and are visiting the fruiterers' shops in swarms.

The conclusion I arrive at, then, is that moths have no very great predilection for sugar, and only come to it when natural food is scarce; and of course only then when the weather is favourable, cold or damp being fatal to success.

Honey-dew seems to be of all things the favourite food; and if a chemist could manage to produce in large quantities, at a reasonable price, an artificial substance resembling it more closely than do sugar or treacle, he, as well as collectors, would probably find it highly profitable.

Market Drayton, September 12th, 1895.

NOTES ON THE LEPIDOPTERA OF THE MACCLESFIELD DISTRICT.

By Richard South.

The investigations I have been able to make into the lepidopterous fauna of the country around the ancient borough of Macclesfield, in the county of Cheshire (elevation 500 feet), have not so far been of a very satisfactory character. Probably the generally unfavourable state of the weather during the fourteen months I have resided here has been the primary cause of the very poor collection made. I am sure that under more suitable circumstances, especially as regards meteorological conditions, some of the localities visited would yield a larger number of species, to say nothing of specimens, than I have yet had the fortune to obtain in them.

I especially expected to have made some good captures on Danes Moss. This is a tract of boggy land situated about a mile south of the town, and, although of somewhat limited area now, was once of considerable extent. At the present time by far the larger portion of it has been reclaimed and is under grass, cereals, or vegetables, principally the first. Still there remains an abundant space of original moss-land to nurture and harbour those species of Lepidoptera which usually flourish in such situations. Although extensively drained by trenches, and consequently less boggy perhaps than formerly, the flora of the present day is probably very little altered from what it was centuries ago. On the drier parts there is a quantity of heather with a little bilberry, and in other parts the cotton-grass grows in great luxuriance. Cranberry is not uncommon in several places, there is a liberal sprinkling of bog-myrtle here and there, and a plentiful growth of bushy sallow and birch.

The moorlands are extensive but somewhat distant. The nearest is about eight miles, and all uphill to get there, as it lies at an elevation of about 1700 feet. An unpleasant feature of collecting on these moors is that rain often falls there, even when the weather at lower elevations is fair. I have only worked two localities on the moors. One of these is beyond the 'Cat and Fiddle,' an inn noted as being the highest licensed house in England; the other is called 'Ludchurch.' The first is partly in Cheshire and partly in Derbyshire, and the other is in

Staffordshire. The latter has been found the most productive in insects, as it also is the most interesting both for its natural charms and the legends associated with it. I have visited each of these places several times, but the weather has always been more or less unfavourable for collecting.

Of woods there are none within some six or seven miles, but as all the hedgerows both of lanes and fields are thickly studded with timber trees of all kinds, there is no lack of pabulum for the larvæ of those species of Lepidoptera that feed on, say, alder, beech, birch, elm (wych), oak, poplar, &c. Cocks Moss is one of several adjoining long narrow strips of woodland lying to the south of the town. These are rigidly preserved, and the entomologist, not being understood in these parts, is considered as something pretty low down in the poaching line of business, and does not meet with favour from the gentlemen in velveteen. At the certain risk of being summarily ejected if seen, I have been several times to these woodlets in the hope of meeting with *Dicranura bicuspis* in one or other of its stages, but I have not succeeded in detecting any trace whatever of this species. There is an abundance of alder in all stages of growth, and the locality altogether seemed to me to be just the spot for the "kitten."

A former collector of British Lepidoptera, now living in this town, but who previously resided at Congleton, a town about eight miles further south, informs me that several of the Argynnidæ and other butterflies used to occur along the Dane Valley. I have not been often to this valley, charming locality though it is, because my attention has been chiefly bestowed on moss and moor. On the occasions, however, when I did give myself the pleasure of an excursion up the valley of the river Dane, I failed to see any other butterflies than the three common Pierids and *Cœnonympha pamphilus.* In fact those species, with the addition of one specimen of *Melitæa aurinia* (= *artemis*), which settled on my lawn, and whose headquarters I could not discover, a few *Chrysophanus phlœas*, and larvæ of *Vanessa atalanta*, are all I am able to chronicle with certainty as butterflies occurring in the district around Macclesfield. There seems to be little doubt that *Cœnonympha typhon* (= *davus*) did exist on Danes Moss, but I am not sure that it occurs there still, although I got a glimpse of a butterfly last year which I fancied at the time was this species. It is also reported to occur on the 'Cat and Fiddle' moor, but I have not seen it there.

The only representative of the Sesiidæ that I have met with is an example of *Trochilium crabroniformis*, which I found at rest on osier on the Moss. I have seen this species at rest in a state of nature more than once, but am always in doubt, for the moment, as to whether the insect is lepidopterous or hymenopterous. Its resemblance to a hornet is much more striking when reposing on a leaf or twig, than when set out as a cabinet specimen. Two or three non-entomological friends to whom I showed the insect whilst alive declared it to be a hornet, and ridiculed my assertion that it was a harmless moth; but one individual, more observant than the others, detected a difference in what he termed the horns.

Of the "hawk moths" I have seen but one species, *Smerinthus populi*. A specimen was brought to me as a great curiosity by a man who seemed to be well acquainted with the insect in its larval state, but he could not understand at first how the winged moth could in any way be associated with the creeping thing. However, the little information I was able to impart so interested him that he determined that in future he would feed and watch all "bots" that he met with, to see what kind of "buzzards" they would produce.

Very few Bombyces have been observed. *Nudaria mundana* occurred sparingly on the old walls, which are built up of stones without mortar, and are a feature of the country on the east of the town; the larvæ of this species were looked for in their season, but could not be found. One or two larvæ of *Spilosoma fuliginosa* were picked up on the Moss in the autumn of 1894, and these produced imagines in May this year. *Hepialus humuli* and *H. velleda* were both common. Series of the last-named were taken on the edge of the Moss, and among grass on the margin of one of the pools above Langley. The latter locality is about a mile and a half, as the crow flies, from the Moss, and something like 200 feet higher. The average size of the Moss specimens is less than that of the Langley examples, and the former are rather brighter. The unicolorous variety (*gallicus*) occurred in both places, but was more frequently taken by the pool. It was noticed each evening that *velleda* ceased flying soon after *humuli* appeared on the wing. Only one specimen of *H. lupulinus* was observed, and this occurred in the garden here. Two female specimens of *Saturnia pavonia* (=*carpini*) were bred last spring, and these were taken on three occasions to the Moss where they had lived as larvæ the previous autumn, but they only attracted half a dozen suitors altogether. After the last male taken had been in the cyanide-bottle a little while, it occurred to me that I ought to have obtained a batch of fertile eggs, so I quickly transferred H. I. M. from the bottle to a gauze-covered box, but he seemed quite dead. However, about half an hour or so afterwards I found him buzzing around right merrily. When I reached home I placed the male and one of the females in a roomy gauze-covered box. Next day a small cluster of eggs was seen, and more the following day. The majority of these shrivelled, but about a score of larvæ hatched out from the remainder, and these fed up well and are now (July 20th) about to spin their cocoons. Young larvæ of *Asphalia flavicornis* have been not uncommon, but examples of mature growth were rarely observed. They seem to be pecked out of their chambers, and devoured by birds when about half grown.

Four species only of Noctuæ have been really common; these are *Xylophasia monoglypha* (=*polyodon*), *Miana fasciuncula*, *Noctua augur*, and *Triphæna pronuba;* on several occasions they were the only moths that visited the sugar at all. The walls of the district have frequently been examined for *Bryophila perla*, but not a specimen could be found thereon; in August last year one example was found on the bare ground at Ludchurch, and attention was then given to the rocks there, but no other specimen was seen. In September these walls produce *Polia chi* in some numbers, but the olive-grey form does not seem to occur. A number of the larvæ of *Acronycta menyanthidis* were collected, principally from sallow on the Moss, but only about five per cent. of these attained the perfect state, although they all pupated satisfactorily. The pupæ were kept indoors; probably it would have been better to have left them in the garden, where the larvæ had been kept. All the examples are pale in colour, but some have broad dark borders to fore wings. *Leucania impura* and *L. pallens* were the sole representatives of the genus noticed in the district. The last-named was most abundant, and a good proportion of the specimens seen were of the reddish form (var. *rufescens*). Four distinct forms of *Xylophasia rurea* occur here in the garden, *i. e.*, the type; a form with rather silvery ground and fewer markings than the type; and two unicolorous forms, in one of which the colour is reddish-brown, and in the other blackish-brown. This species did not come freely to sugar; most of the examples taken were netted. As previously mentioned, *X. monoglypha* occurs commonly, but it is rather surprising that none of the specimens show any tendency towards melanism, seeing that black forms of some other species, presently to be referred to, are found here. Of *Apamea didyma* (=*oculea*) the majority of the specimens are unicolorous brown or greyish-brown in colour (var. *nictitans*), and only two of the white-spotted black form (var. *leucostigma*) have occurred. Last year *Miana arcuosa* was pretty common, but very few specimens have been seen here this year. This species occurs in a field adjoining my garden.

In 1894 I saw a good number of *Celæna haworthii* flying over the heather on the Moss, but they were difficult to capture. Sugar did not seem to have any attraction for them. They flew most freely about an hour before dusk. I examined heather-bloom with a lamp, but without result so far as concerns this species. I have not seen it this year. Only one specimen of *Grammesia trigrammica* (=*trilinea*) has been noticed, and this was an example of the var. *bilinea*. One *Noctua glareosa* was found at rest on the ground among heather in the wood at the back of the 'Wizard Inn,' Alderley Edge. Only one example of *N. brunnea* has been seen, and this came to sugar on the edge of the Moss, as also did about a dozen specimens of *N. festiva*; but most of the latter were in poor condition and of the small form generally referred to as var. *conflua*. *Triphæna pronuba* has been very abundant this year and exceedingly variable, but very few *T. comes* (=*orbona*) have been seen. An example of *Orthosia suspecta* was found at rest on the trunk of an oak-tree at Alderley, but this species, like *N. glareosa*, did not seem to care for sugar. Larvæ of *Xanthia fulvago* (=*cerago*) were common in sallow-catkins on the Moss, and produced var. *flavescens* in the proportion of 1 in 20. A few *Dianthœcia capsincola* were bred from larvæ feeding in seed-capsules of sweet-william. A number of larvæ of *Cleoceris viminalis* were collected on the Moss, but only four imagines were bred from them; these are of a leaden colour. Half a dozen larvæ of *Agriopis aprilina* were found on oak-trunks at Bollington, a place about three or four miles from here. *Phlogophora meticulosa* was rather common last autumn, and several of the specimens taken have rosy-brown markings instead of the more usual olive-brown. *Hadena adusta*, *H. trifolii*, and *H. oleracea* have all been more or less scarce, but of the latter there are now a number of larvæ about. A nice series of darkish specimens of *H. thalassina* were bred in June this year from a batch of eggs found on a twig of sallow in the beginning of July, 1894; a few examples of the species were seen at sugar. *Plusia bractea* has been not uncommon in the district in years gone by. I am told that a collector living in the town some thirty or forty years ago used to take from 12 to 20 specimens in an evening at the flowers of honeysuckle. I have visited the actual spot where he used to work, but neither there nor elsewhere have I had the fortune to meet with this pretty insect. There are sundry odd examples of *P. bractea* in various cases of insects about the town, but the condition of every one of them is very shocking.

Among the Geometræ observed in this district the most abundant was *Rumia luteolata* (=*cratægata*). Only two specimens of *Uropteryx sambucaria* have been seen, and both are below the average size. I was unable to search for *Phigalia pedaria* (=*pilosaria*) at the time this species was out, but a very black female was found on an apple-tree in a neighbour's garden, and from a batch of ova which she deposited I now have a number of pupa, which I hope may produce some dark male specimens next year. From a larva of *Amphidasys betularia* obtained in September, 1894, an example of the black variety (*doubledayaria*) was reared this year; this is the only specimen of the species that I have met with here. Two larvæ of *Geometra papilionaria* were beaten from birch at Cocks Moss. *Acidalia subsericeata* occurs in one or two places around here, but it does not seem to be common. Of *Abraxas grossulariata*, I have only seen four or five specimens, and these were very ordinary. *Larentia* *cæsiata* occurs on the moor at Ludchurch, but was most frequently obtained from walls in the lanes below the moor. Although an abundance of its food-plant, yellow rattle, grows in most meadows here, I have not seen *Emmelesia albulata* within two miles of the town. *E. alchemillata* has been scarce, and *E. decolorata* not common. One very fresh specimen of *Eupithecia venosata* was taken in a lane near my house, but I could not find any more of this species. *E. pulchellata* appears to be not uncommon, especially in the lanes in June; larvæ were found in July. Larvæ of *E. subfulvata* are not scarce or difficult to find in September feeding on yarrow growing on hedge-banks; the partly devoured foliage indicate the presence of the larva. *E. castagata*, *E. nanata*, *E. vulgata* all appear to be scarce, and *E. minutata*, which occurs on the Moss, is not common. *Hypsipetes trifasciata* (=*impluviata*) seems to be very scarce; a few larvæ were found in 1894, but only one imago resulted from them, and it was crippled. *H. sordidata* (=*elutata*) has been very abundant in the larval stage on bilberry, but only a few were found on sallow; two or three were found on bog-myrtle (*Myrica gale*). The moths from the bilberry larvæ are very interesting, the majority being very dark in coloration, several indeed entirely fuliginous. Among the green forms many of the specimens have this colour very bright and arranged in fine transverse lines. *Melanippe montanata* has been pretty common; all the specimens examined were of a clear white, with few markings beyond the central fascia, which was generally well defined and sometimes almost black in colour. Two specimens of *M. galiata* were found on the hills sitting on a wall. *M. fluctuata* does not exhibit anything striking in the way of variation. *Cabera pusaria* has been generally common among alder. In the specimens occurring at Cocks Moss all the lines are strongly marked, and in one example captured they are broader than usual. *Coremia designata* (=*propugnata*), *C. ferrugata*, and *C. unidentaria* were each represented by a solitary specimen. *Camptogramma bilineata* has not been very common. *Cidaria miata*, *C. immanata*, and *C. populata* all appear to be pretty abundant, and some specimens of the second species have the central fascia grey, and are quite different from any form that I have met with before; *C. suffumata* does not seem to occur in the unicolorous form in this district. *Cidaria fulvata* has not been seen in any numbers, but appears to be out a long time. *C. dotata* (=*pyraliata*) has been met with occasionally. *Tanagra atrata* (=*chœrophyllata*) is very common in one or two localities in the district, but especially so around the margins of the pool at Langley.

(To be continued.)

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 254.)

Tæniocampa pulverulenta, *Esp.* — A considerable interest attaches to this species from a distributional point of view, and it would be well that its life-history and peculiarities should be studied, with the view of elucidating the anomaly it presents; the experience of British and Irish collectors being vastly different. Though numerous almost everywhere across the water (*teste* Newman and Stainton), it is here local and usually scarce. For many years I collected Tæniocampidæ in Ireland without meeting any but single specimens of *pulverulenta*. At Killarney I found five at a particular sallow, but during the ensuing fortnight, over a wide district about the Upper Lake, I made no further capture of it, though other species were numerous. It is plentiful in Co. Wicklow, from Arklow to Wooden Bridge, the type of dark warm grey, and ab. *nana*, Haw. (pale grey) and ab. *pusillus* being represented. At Clonbrock, Co. Galway, it is also very abundant, though apparently absent at Mount Bellew and Ardrahan in the same county. The Clonbrock specimens offer a certain amount of variation, some being profusely powdered with red scales, while others are characterised by well-developed series of spots and strongly-marked stigmata. Other localities are Co. Wicklow, Powerscourt, one; Ashford, a few; but about Shillelagh Mr. Bristow never met with it; Phœnix Park, a few; Sligo, two (*Tutt*); near Kenmare, a few, Co. Kerry; none recorded from the Belfast district by Messrs. Bristow and Watts; nor have I taken it in Co. Tyrone or Monaghan.

Orthosia suspecta, *Hb.*—The late Mr. F. Bond showed me some very lovely forms of this species, taken at Killarney by Bouchard. Recorded on somewhat doubtful evidence by the late Mr. Sinclair from the Co. Londonderry. Co. Wicklow (*B.*).

[*Orthosia fissipuncta*, Haw., *Ypsilon*, Bork.—Recorded by Birchall, probably on insufficient authority, from Co. Wicklow.]

Orthosia lota, *Clerck.*—Widely distributed, but somewhat local. The red form is the more prevalent one, but near Sligo (*Russ* and *McC.*) dark grey specimens are also not uncommon, some examples assuming a very dark leaden hue.

Var. *suffusa*, Tutt. Co. Dublin, and Ashford, Co. Wicklow, not rare; Cappagh, Co. Waterford, rare; Killarney, Tarbert, scarce.

Var. *rufa.*—Clonbrock and elsewhere in Galway, fairly abundant; L. Gill and Markree Castle, Co. Sligo, not common;

Farnham, Co. Cavan, scarce; Tullamore, King's Co., scarce; Killynon and Cromlyn, Co. Westmeath, fairly numerous; rather rare at Belfast (*W.*); Derry (*C.*); Castle Bellingham (*Thornhill*); Drumreaske and Favour Royal, Co. Tyrone.

ORTHOSIA MACILENTA, *Hb.*—Generally distributed, and often abundant. The pale straw-coloured form is somewhat scarce. Examples of either colour have the stigmatal blotch obsolete. Hazlewood and Markree, Co. Sligo, numerous; and at Cromlyn (*Mr. B.*); Killynon, Co. Westmeath; Favour Royal, Tyrone; Farnham, Cavan; Derry (*C.*); Tullamore; Cappagh, Co. Waterford; Killarney; Ashford, &c., Co. Wicklow; and Co. Dublin.

ANCHOCELIS HELVOLA, *L.* (*rufina*, L.).—This, like *Tæniocampa pulverulenta*, is one of the distributional anomalies of our Irish fauna. This common British moth is decidedly rare in Ireland, although Mr. Birchall, probably by some confusion of memory between his English and Irish captures, recorded otherwise. The few specimens I know of are of the dull red inconspicuously banded form. One at Clonbrock (*R.E.D.*); Armagh (*I.*); and Ashford, Co. Wicklow; three at Cappagh, Co. Waterford (*Miss V.*).

ANCHOCELIS PISTACINA, *Fb.* — Common and widely spread. Variable, from clear pale greyish brown, or ochreous grey, to brick-red ground colour, the markings presenting every stage of obsolescence, the ab. *ferrea*, Haw., being sometimes met with quite unicolorous. The latter is somewhat localised in Ireland. Other aberrations met with are *serena*, Esp.; *sphærulatina*, Haw.; *lineola*, Haw.; and *venosa*, Haw.

ANCHOCELIS LUNOSA, *Haw.*—Widely distributed, but most abundant on the sea-coast. It is one of the most variable of the Orthosiidæ, and all the known forms are represented in Ireland, the ab. *agrotoïdes*, Gn., being sometimes extremely black, with very pale nervures. A strikingly fine form, not rare on the S.W. coast, Saltee Islands, &c.

ANCHOCELIS LITURA *L.*—Three specimens at Clonbrock, Co. Galway (*R.E.D.*).

CERASTIS VACCINII, *L.*—Universally distributed and common. The mahogany-coloured type with dark shading in the reniform stigma, and the chestnut form with distinct waved lines and dots are both common. The deep-mahogany unicolorous form, *unicolor*, Tutt, is also not rare.

CERASTIS LIGULA, *Esp.* (*spadicea*, Hb.)—A rare Irish species.

Var. *subnigra*, Haw., marked with antemarginal pale band; and var. *spadicea*, Haw., are both represented in Ireland. Localities:—Killarney, four; very scarce at Favour Royal, Tyrone; Farnham, Cavan; and Belfast (*W.*). (Co. Wicklow was recorded in mistake by Mr. Birchall, but it probably occurs there.)

Cerastis erythrocephala, *Fb.*—The Hon. R. E. Dillon took two examples at ivy on the same evening of a peculiar form of this species, redder than var. *glabra*, Hb., and intermediate between it and the type.

Scopelosoma satellitia, *L.*—Generally very common, but somewhat uncertain in distribution. Varies as in Great Britain.

Dasycampa rubiginea, *Fb.*—Taken by Birchall at Dublin, Tullamore, and Killarney; Devil's Glen, Co. Wicklow; one near Galway (*R. E. D.*).

Oporina croceago, *Fb.*—One specimen bred from a larva taken at Clonbrock (*R. E. D.*).

Xanthia citrago, *L.*—Co. Wicklow (*B.*); two at Clonbrock, Co. Galway (*R. E. D.*).

Xanthia fulvago, *L.*—Probably widely distributed, but less frequent than the following species. I have not taken the var. *gilvago*, Haw. (*flavescens*, Esp.); but the intermediate aberrations with more or less obsolete markings are occasionally found. Co. Wicklow, abundant (*B.*), Powerscourt; Kilderry and near Derry, abundant (*C.*); Enniskillen, abundant (*Col. Partridge*); Armagh (*J.*); Castle Bellingham, one (*Thornhill*); Belfast, scarce (*W.*); Killarney, abundant; Markree, Co. Sligo, &c.

Xanthia flavago, *Fb.*—Found in most localities, and not scarce. Ashford, Powerscourt, Kilcool, and Greystones, Co. Wicklow; Glengarriff, Killarney, and Sneem, Co. Kerry; Cappagh, Co. Waterford; Hollybrook, Markree, Lissadell, and L. Gill, Co. Sligo; Clonbrock, Co. Galway (*R. E. D.*); Derry (*C.*); and Mishowen (*G. V. H.*), Belfast; Favour Royal, and Drumreaske, Monaghan; Armagh (*J.*); Enniskillen (*S.*); Killynon (*Miss R.*); Cromlyn (*Mrs. B.*); Westmeath.

Xanthia aurago, *Fb.*—Birchall notes that it was reported as taken by a Mr. Haughton, but no locality recorded. One at Clonbrock (*R. E. D.*).

Xanthia gilvago, *Esp.* — One at Clonbrock, Co. Galway (*R. E. D.*).

Xanthia circellaris, *Hufn.*—Everywhere very abundant. Irish examples usually seem less strongly marked, and paler than the form I am familiar with in the South of England, which have the pattern of waved strigæ, &c., distinctly represented.

(To be continued.)

NOTES ON THE SYNONYMY OF NOCTUID MOTHS.

By Arthur G. Butler, Ph.D., F.L.S., &c.

(Continued from p. 227.)

Azeta, *Guen.*

M. Guenée confounded two genera under *Azeta*, represented by *A. uncas* and *A. vampoa*; the former will have to stand as the type, because *A. vampoa*, *rhodogaster*, and *mirzah* (his other three species) are synonymous, and identical also with the type of Walker's genus *Chabora*. *Azeta* differs from *Chabora* in the female (the male of *A. uncas* is, at present, unknown to me) having more evidently ciliated antennæ, a decidedly longer third joint to the palpi, more hairy legs, with stouter spurs, and with decidedly shorter discoidal cells to the wings.

Azeta uncas.

Azeta uncas, Guenée, Noct. 3, p. 359, n. 1833 (1852).
Hypernaria (sic) *continuens*, Walker, Lep. Het. xv. p. 1614, n. 2 (1858).
West Indies; Jamaica. In Coll. B. M.

Chabora, *Walk.*

Chabora repugnalis.

♂ *Pangrapta repugnalis*, Hübner, Samml. Exot. Schmett. Zutr. (drittes hundert) p. 37, n. 288, figs. 575, 576 (1825).
♀ *Azeta vampoa*, Guenée, Noct. 3, p. 360, n. 1834 (1852).
♂ *A. rhodogaster*, Guenée, *l. c.*, n. 1835 (1852).
♀ *A. mirzah*, Guenée, *l. c.*, n. 1836 (1852).
Thermesia fusilinea, Walker, Lep. Het. xv. p. 1564, n. 6 (1858).
Chabora undulifera, Walker, *l. c.*, Suppl. 3, p. 114 (1865).
Thyridospila? suffusa, Walker, *l. c.*, Suppl. 5, p. 1970 (1866).
Jamaica, St. Domingo, Venezuela, Pará, Rio Janeiro. In Coll. B. M.

Chamyna, *Hübn.*

Chamyna ceramina.

♂, ♀ *Chamyna ceramina*, Hübner, Samml. Exot. Schmett. 2, pl. 205, figs. 1-4 (1806).
♀ *Hypernaria* (sic) *metaspila*, Walker, Lep. Het. Suppl. 3, p. 1087 (1865).
Venezuela and Ega. In Coll. B. M.

Chamyna sera.

♀ *Plaxia sera*, Walker, Lep. Het. xv. p. 1628, n. 8 (1858).
♂ *Thermesia imbuta*, Walker, Char. Undescr. Lep. p. 56, n. 94 (1869).
Honduras, Limas. Types in Coll. B. M.

The genus *Plaxia* will, I think, have to be restricted to its type *P. macarea*. The species figured by Felder under the name of *Apistis* (*Argidia*) *mormon* is, in my opinion, a New World representative of the genus *Emmonodia*, with which it corresponds in general pattern, the coloration of the body, and in the structure of the legs; the densely hairy hind legs are very similar to those of *Emmonodia pudens*, but quite unlike the legs of *Apistis* and allied genera; the antennæ are pectinated in the male, and the palpi are markedly longer than in *Emmonodia*, so that it will have to be a distinct genus.

In the so-called families Amphigoniidæ and Focillidæ there are various distinct types belonging to the Dysgoniidæ, Thermesiidæ, and Hypenidæ respectively, whilst the following are allied to *Ischyja* and *Platyja*.

Phagytra, *Walk.* = Masca, *Walk.*

Placed by Walker in the heterogeneous group Platydidæ. The typical species *P. leucogastralis* is widely distributed, our examples having been received from Java and Ceram. The type of *M. abactalis* is from Singapore.

(To be continued.)

NOTES AND OBSERVATIONS.

Note on the Earlier Larval Life of Stauropus fagi.—Thanks to Mr. Barnes, of Reading, who most kindly sent me a living female of *Stauropus fagi* (of the melanic type), which he had found on May 20th in the birch-woods in his district, I have been enabled to closely study the earlier life of this larva.

I kept the moth alive for seven days, during which time she deposited a few ova each night: these were scattered on some oak-leaves I had placed in with her. All told, she produced for me forty eggs; and she was then quite exhausted, so that doubtless she had previously deposited a good many ova. The last six laid proved infertile, or so weak that, although they changed colour, they failed to hatch. The eggs when first laid are of a pale cream-colour, in shape hemispherical, fattened beneath. About the seventh day a circular depression and a dark spot appear, and gradually a dull purple colour pervades the whole area. On the tenth day the larvæ hatch out. The larvæ when first they leave the shell appear unusually large; this is partly on account of the very curiously long legs and the two caudal appendages, which are ever nervously twisting about. The young larvæ most carefully keep guard over their own egg-shell, which is to them an all-important item, as this provides them with their first meal—their first and the only food they take for seven days, in fact for a longer period, as it is not until after moulting their first skin that they eat any other food. This fact I proved over and over again, as, being an invalid, my time was quite free to watch them hour after hour and day after day. As soon as they have eaten their way out of the shell they stretch themselves, and then from time to time nibble portions of the white chitinous-looking egg-shell, and a tough morsel it seems to be for them; but they never leave it for more than an inch or so, when they rapidly come back. They keep nervously moving round and about this, and if perchance another larva should approach within touch of it, a vigorous attack is made to drive off the intruder. All going well during the first hour or two, the whole of the shell, or sometimes not more than from half to two-thirds of it, is consumed; and once the larva really leaves the egg-shell, that is, walks away from it, they do not touch it after. If by any chance a young larva gets driven away from the egg-shell, death is the certain result, as I could never induce them to feed on portions of empty shell left by others; nor would they eat the leaves or the brown stipules of the beech, which it has been suggested they do eat. In no single case did they eat other food in their first skin save and alone the one meal off their own egg-shell. It is a common thing for many larvæ to eat their own egg-shells, but so far as my experience goes, this is the only species that I have found for which one meal has proved to be all-sufficient for a seven-days' existence, or until the change of the first skin. I do not put this forward as anything new; still, perhaps the fact has not been quite so closely watched as I was enabled to do, and these details may prove of interest to some. Full details of its later changes of skin, and pupation of the larva of *S. fagi*, have been ably given in Buckler's 'Larvæ,' &c.—W. H. Tugwell.

Notes on Bombyx trifolii.—During a stay at Salcombe, South Devon, this spring, I again had opportunities of observing the habits of the larvæ of *Bombyx trifolii*, but owing to the severity of the winter they were later than last year in appearing after hybernation; this year none appeared till April 26th, as against April 14th in 1894, and the two specimens secured on that day were very small indeed. These and several others found in April were at rest on dead bracken or bare stumps of blackthorn, and it was not until May 1st that I saw one actually feeding; my approach disturbed it, and it began wandering about; during the course of its wanderings it was attacked by an ant, from which it escaped by energetic writhing. At the end of a twenty-minutes' journey it got into a region of dead gorse, so I removed it to a place where there was some vegetation; it took two minutes to recover from the shock and then began cautiously to move; at last it fell-to on a blade of a short slender grass which grows among the heather—unfortunately I do not know its name; it devoured two blades of this, and then resumed its wanderings and was boxed. After this I had no further opportunities of observing these larvæ in their natural state; but this observation, as well as those recorded last year (Entom. xxvii. p. 198), seems to show that, at any rate in Devonshire, the larva of *B. trifolii* is a more general feeder than Mr. Bickerton Jones's note (*ante*, p. 56) would seem to imply. It may be worth mentioning that this year I found one larva on the east side of the harbour.—D. P. Turner; Tonbridge, Sept. 13th, 1895.

Cœnonympha typhon in the West of Scotland.—With reference to Mr. Arkle's note (*ante*, p. 257) regarding *Cœnonympha typhon*, in this district it is an exceedingly variable butterfly, even in any single locality where it may be taken. I have not a long series, but perhaps my best specimens were taken in North Knapdale, Argyleshire. The majority are of a dark tawny colour, though some are warmer in tone than others. I have one large pale-ochreous specimen which, though having the rudimentary eye-spot on the upper wing, has another, equally large and almost as distinctly marked, just below the median nervure, and ocellated on the under side; there are on the under side of lower wing seven distinct eye-spots, three being ocellated; the bar on this specimen is uninterrupted. Another very dark specimen, perhaps owing to its being smaller than usual, the under side of which, instead of being dusted with silvery grey, is of a rich brown dusted with green, though grey at the base; this specimen has six very large and prominent eye-spots on the under side of lower wing, all of which are ocellated, and another black spot joined to the spot at the inner margin; there are also two light markings on the under side of upper wing below the median nervure; the bar on this insect is decidedly broken. Another intermediate form has the rudimentary eye-spots entirely obliterated on the upper side of all the wings, and but the slightest indication of a spot on the under side of each; the bar is slightly broken. It would, however, take too much space to describe many specimens; they vary in colour, number of spots, and the bar on under wing is sometimes uninterrupted, though oftenest broken.—A. Adie Dalglish.

The Senses of Insects.—From practical observation I have certainly been under the impression that *some* Lepidoptera do possess the power of hearing independent of the sense of touch, serving them as a warning and protection. As instances I will cite firstly, *Boarmia repandata*. Frequently, when walking in woods searching for Lepidoptera at rest on the trunks of trees, this insect has started off some distance away, long before it was visible at rest; and I have known it, after re-settling, it may be, on the reverse side of a tree out of sight, start off before I could reach it. *Hypsipetes elutata* (*sordidata*) has frequently appeared to me to do the same; and in the case of *Cidaria truncata* I have frequently exclaimed, "That insect must have heard me." It is well known how much more acute the powers of vision are in some Lepidoptera, apparently, than others. *Tephrosia crepuscularia* is easily boxed at rest; *T. punctularia* I have not found so at all times. Some of the *Eupithecia* start off before you can touch them, or whatever they may be resting on; and other instances could be named showing that they, if at rest, have one eye open. Why then may not some have auditory powers more acute or sensitive than others? In the case of striking the trunks of trees the concussion or vibration would doubtless be the cause of disturbing the insects referred to; but their frequently taking flight when apparently no disturbing sound has been made by concussion appears to show the possession of another sense. It is well known how different species of Lepidoptera differ in their habits adopted for protection, some relying on very acute vision, others on their resemblance to their surroundings. May not some species, then, be able to detect sound apart from sensitiveness to concussion or vibration?—T. B. Jefferys; Bath, Sept. 19th, 1895.

Unusual Pairing of Dragonflies.—I think I ought to record the fact that on Aug. 15th last, in Talbot Woods, near Bournemouth, I took a male *Æschna cyanea* paired with a female *Æ. juncea.*—W. J. Lucas; St. Mary's, Knight's Park, Kingston-on-Thames.

South London Entomological and Natural History Society.—This Society announces an exhibition to be held at St. Martin's Town Hall, near Trafalgar Square, on October 17th next. We congratulate the committee of management upon having secured such a very conveniently situated building for the purpose, and we hope that all who are interested in natural history will give the enterprise their hearty support. Particulars may be obtained from the Hon. Sec., Mr. Stanley Edwards, Kidbrook Lodge, Blackheath, S.E.

CAPTURES AND FIELD REPORTS.

Mallota eristaloides.—I was glad to note in your last number that Mr. Dale reports having taken this insect (wrongly printed "*cristaloides*") as far back as 1880. The fact of this specimen being taken on the 18th, and mine fourteen years later, on July 20th, seems to mark the month when it should be sought for; and partly with this object in view I started for the New Forest on July 15th. Owing to the very hot weather during May and June, the season proved unusually early, and on my arrival I found nearly all the other Diptera I expected to collect were already over, although in 1894 they were only just coming out, and this may have been the case with *Mallota*, supposing it put in an appearance at all. My efforts, therefore, as regards this species were fruitless, or rather insectless; but I still hope we may have a *Mallota* year, as we have had those of *Callicera*, *Spilomyia*, &c.—F. C. Adams; 68, St. Ermin's Mansions, Westminster; and Fern Cottage, Lyndhurst.

Melanostoma hyalinatum and Callicera ænea.—The former insect has turned up in some numbers this year in the New Forest, and during the first fortnight of August I took nine males and nine females. It was still out when I left, and Mr. Venall informs me he has not seen it for twenty-five years. I also saw a fine specimen of *C. ænea* taken by a lady last June in a garden at Lyndhurst.—F. C. Adams; Sept. 12th, 1895.

Callicera ænea in Hampshire.—On May 22nd last I had the good fortune to capture a very perfect specimen of *Callicera anea*, which settled on a rose in our garden. I believe I am right in saying that this fly has not been taken since 1888, when three specimens were recorded from different localities.—Laurence C. Chawner; Lyndhurst, Hants.

Deiopeia pulchella in Sussex.—When staying at Bexhill, this time last year, I succeeded in capturing a very fine specimen of *Deiopea pulchella.*—Alistoir R. Potter; Hazeldene, Bexley, Kent, Aug. 30th, 1895.

Stilbia anomala in Nottinghamshire.—I have the pleasure to record a fine specimen of *Stilbia anomala* taken here by my sister on Aug. 23rd. Newman says, "It would seem that no entomologist has observed it in the Midland Counties of England." I find an old note of its capture by the late J. Trueman, of Edwinstowe. But this is a solitary record, and moreover very old. Can any reader of the 'Entomologist' give me a more modern instance?—(Rev.) E. Alderson; Worksop, Notts.

Acherontia atropos in Co. Waterford, Ireland.—I copy the following extract from a local newspaper, the 'Waterford Standard,' dated Sept. 14th, 1895:—"Death's Head Hawk Moth.—A fine specimen of the Sphinx *Acherontia atropos* was captured at Tramore on the 2nd inst. by Mr. Thomas Power, who presented it to Dr. Norris Cane, of Mullinavatt. It is now four years since another specimen of this moth was caught in Waterford, and also presented to Dr. Cane by Dr. Geo. J. Mackesy."—L. H. Bonaparte-Wyse; Manor of St. John's.

Acherontia atropos in Glamorganshire.—I have recently received a perfect male specimen of *A. atropos*, which was found being washed ashore in a breaker at Porthcawl by Mr. R. H. Tiddeman, who sent it through the post loosely laid in a tin box; notwithstanding this treatment, and a sea bath, it reached me uninjured, which is rather extraordinary.—F. W. Frohawk.

Acherontia atropos in Shropshire.—I have had eight larvæ of *A. atropos* brought to me; all were taken in small patches of potatoes in gardens in the town, and I hear of children playing with and destroying others. So far as I can ascertain there are few previous records of the occurrence of this species here. All the people who brought larvæ were astonished at them, and said that they had never seen such things before.—F. C. Woodforde; Market Drayton, Salop, Sept. 2nd, 1895.

Vanessa c-album in Shropshire.—On Aug. 29th I saw a specimen of *V. c-album* on the outskirts of the town. It settled on a wall in the sun and spread its wings, but as I had no net with me I could not catch it.—F. C. Woodforde.

Sphinx convolvuli in 1895.—The 'Field' announces the following captures of *Sphinx convolvuli*:—One specimen, sent for identification, caught at rest by a workman while sorting bamboos, Alnwick, Northumberland. "J. F. G.," Benacre Hall, Wrentham, reports the capture of seven specimens during the first week of this month, the largest measuring 5 in. in expanse. "They haunt the tobacco plants at twilight, and dash around as with a purring sound, varied by a hawk-like hover over the fully-opened blooms." Mr. R. L. Bridger, Mitford-on-Sea, Hants, records the capture of eight specimens during the early part of the month, six of them taken on consecutive nights in a small greenhouse.—F. W. Frohawk.

Sphinx convolvuli in Hampshire.—It may be of interest to note that twenty-three specimens of *S. convolvuli* have been taken here this season.—W. G. Hooker; Sunny Side, Winton, Bournemouth, Sept. 10th.

Sphinx convolvuli in Devon.—My brother and I have been staying for the last fortnight near Sidmouth, Devon. On Sept. 5th, a fine clear evening, with a very heavy dew, we had the fortune to find, hovering over a large bed of *Nicotiana affinis*, a large though rather rubbed female specimen of *S. convolvuli*. Again on the 7th, hovering over the same flower, we found a fine male example, quite undamaged. We have since heard of a lady in the neighbourhood who captured nine of the same species over the *Nicotiana* this season. We have also seen several specimens of *Vanessa cardui*.—G. H. Neel; 17, Ladbroke Square, Notting Hill, W.

Sphinx convolvuli at Tunbridge Wells. — Mr. Chatfield, of this town, brought me a very fine specimen of *S. convolvuli*, which he took at rest near the Toad Rock on Rusthall Common on Aug. 27th. As far as I know, it has never been taken here before.—R. A. Dallas Beeching; Tunbridge Wells.

Sphinx convolvuli in Aberdeenshire.—A specimen of *S. convolvuli* was caught here on Aug. 31st; it was very much worn. A second was caught on Sept. 9th, in fine condition, the tips of the wings a little touched in capturing.—J. Salter; Strichen, Aberdeenshire.

Sphinx convolvuli in Surrey.—I have much pleasure in recording the capture of *Sphinx convolvuli*, male, in our own garden on the 12th inst. It was apparently attracted by the tobacco plant. I also had a female brought me which has deposited a number of eggs. — Geo. Stanley Morley; Oakdene, Epsom, Sept. 19th, 1895.

Leucania albipuncta near Ashford. — I captured a specimen of *L. albipuncta*, at sugar, near here on August 24th. — D. Chittenden; Willesborough, Lees, Ashford, Kent.

Xanthia gilvago in North Shropshire. — From a large number of larvæ, beaten on June 1st from the seed-vessels of the wych-elm, I have just bred two specimens of this local species; the remainder (about 100 in number) turning out *X. ferruginea* (*circellaris*). I believe this is a new locality for the insect. — (Rev.) Chas. F. Thornewill; Calverhall Vicarage, Whitchurch, Salop, Sept. 7th, 1895.

Catocala nupta attracted by Cossus. — On Sept. 14th, about 11 p.m., when passing through Barnes, my attention was drawn to some moths flying round the trunk of a large poplar tree, which on examination proved to be inhabited by *Cossus* larvæ. These moths turned out to be *Catocala nupta*, evidently attracted by the effluvia of these larvæ. I found altogether nine females and one male, six of the former taken at rest; these allowed me to approach and bottle them without trouble. I saw many others, but failed to capture them.—H. W. Bell-Marley; Ravenscourt Park.

Polia flavicincta in Yorkshire.— On Sept. 12th I found a fine specimen of *Polia flavicincta* at rest on a wall in the town at Scarborough, and on the 16th I found another specimen. I thought this worth recording because I believe this species is not often met with so far north.—H. W. Shepheard-Walwyn; Bidborough, near Tunbridge Wells.

Broscus cephalotes at Retford. — In my first year's collecting Coleoptera I have made one "find" that may be worth reporting. I took a dozen specimens of *Broscus cephalotes* at Retford. It is described in the books as purely a coast insect.—Stephen Pegler; Retford, Sept. 16th.

Colias edusa in Britain in 1895.—

Berkshire.—On Aug. 18th I saw two male *C. edusa*, and captured one, in fine condition; and on Aug. 25th I captured one male very much worn.—W. E. Butler; Hayling House, Reading.

Cornwall.—During a ten-days' visit to the far south and west of Cornwall I noticed six specimens of *C. edusa*, all on the cliffs or on the sandhills ("towans" as we call them in Cornwall) of the sea-coast. Two of the specimens were seen at Lelant on Aug. 27th, three at the Lizard on the

28th, and one at Hayle on Sept. 1st. Butterflies in general were numerous, the only conspicuous exception being *Pyrameis cardui*, of which I did not see a single example, common Cornish species as it is *Satyrus semele* abounded on the farthest steeps of the Land's End, while *Vanessa urticæ* swarmed everywhere. The beautiful sea-holly, which grows commonly on that coast, seemed to have stronger attractions to butterflies than any other flower then in blossom.—Harold Hodge; 2, Essex Court, Temple.

Devonshire.—Several specimens of *C. edusa* seen during the last week in August at Barnstaple, Devon.—'*Field.*' Whilst staying at Sidmouth for the last fortnight, my brother and I saw several specimens of *C. edusa* about the cliffs.—G. H. Neel; 17, Ladbroke Square, Notting Hill, W.

Kent.—On Aug. 22nd I saw a specimen of *C. edusa* near here, two others also being seen, and on Aug. 28th I took one specimen.—D. Chittenden; Willesborough, Lees, Ashford, Kent. On Aug. 1st I witnessed the capture of a male *C. edusa* near here by a friend.—D. P. Turner; 14, Havelock Road, Tonbridge.

Suffolk.—At Clare this summer I took three specimens of *C. edusa*, a female on Aug 15th and males on the 20th and 21st. Afterwards, at Brightwell, near Woodbridge, I saw a *Colias*, presumably *edusa*, on the heath; this was on Sept. 3rd. On the following day I caught a male *edusa* not far from the same spot.—D. P. Turner.

Sussex.—Hearing that a few specimens had been seen about the end of May last, and knowing they meant that an "*edusa* year" would follow to some extent, I journeyed to Littlehampton on Aug. 25th, accompanied by Mr. J. H. Carpenter, for the express purpose of meeting with this interesting species. We had not long arrived before a worn male was captured, and later on we captured a few more, including a worn *helice*; about a dozen specimens were taken, mostly males, all of which were set at liberty, being more or less worn. The females only were kept for ova.—F. W. Frohawk; Sept. 14, 1895. During a week's stay near Brighton about the middle of August, I noticed that *C. edusa* was fairly plentiful and usually in good condition, in the clover and lucerne fields on the coast between Brighton and Newhaven.—H. W. Andrews; Victoria Road, Eltham. Whilst staying at Brighton for a fortnight, from Aug. 10th to 24th, my brothers and I took *C. edusa* commonly. Among the specimens captured were three examples of the var. *helice* and a male with the black spot in the centre of each fore wing replaced by a red one. Is this of common occurrence?—C. E. Bedford; Murivance, Acton, W.

Wiltshire.—Twenty specimens of *C. edusa* seen Aug. 17th at Salisbury. '*Field.*' During August and September *C. edusa* has been very abundant. My sister took a sulphur-coloured variety in the early part of August.—C. W. Gummer; 2, Swayne's Close, Salisbury.

SOCIETIES.

South London Entomological and Natural History Society.—*August* 22*nd*, 1895.—Mr. T. W. Hall, F.E.S., President, in the chair. Owing to the holidays and the storm the meeting was unusually small. Mr. South exhibited smoky varieties of *Rumia luteolata*, L., taken this year near Macclesfield; also specimens of *Hypermecia cruciana*, L., *Tortrix cinnamoneana*, Tr., *Eupithecia venosata*, Fb., and *E. pulchellata*, St., from the same locality. Mr. Hall stated that he possessed similar varieties of *R. luteolata* from Scotland. Mr. Moore, series of the following Arachnidæ from St. Augustine's, Florida, viz.:—*Nephila clavipes*, *Atreus americanus*, and *Gasteracantha cancriformis*. Mr. West, of Greenwich, specimens of *Chrysomela gœttingensis*, L., taken this year at Bookham and Box Hill, and remarked that he had never taken the species before. Mr. Turner, specimens of *Scodiona belgiaria*, Hb., from Oxshot and Shirley, and a series of *Hadena pisi*, L., bred from larvæ obtained at Barnes, and showing considerable variation, from almost uniform reddish brown to forms having a deal of greyish white marking. Several members reported having seen or captured *Colias edusa*, Fb., and one var. *helice* had been taken in the Isle of Wight. Mr. Barrett stated that Noctuæ were very abundant in the North of England, especially *Orthosia suspecta*, Hb., which simply swarmed. *Noctua depuncta*, L., was also reported in some number.

Sept. 12*th*.—The President in the chair. Mr. Jäger exhibited a melanic specimen of *Agrotis vestigialis*, Hufn., from North Wales, both upper and lower wings being black. Mr. Winkley, a species of *Dermestes* from Japan. Mr. Fremlin, a fine series of *Polia chi*, L., var. *olivacea*, St., from Cheshire; a bred series of *Phorodesma smaragdaria*, Fb., from Essex; and a bred specimen of *Prionus coriarius*, L., from Surrey. Mr. Tutt, a number of cases of a large species of *Psyche* from the Argentine Republic. They were mostly cocoons of the vermicular female, and contained either young larvæ or ova. He stated that a similar species had recently been described in America as causing much damage. Mr. Adkin, series of *Dianthœcia nana*, Rott., and *D. capsincola*, Hb., bred from N. Devon larvæ, one of the former being of a rosy tinge; also a curious bred specimen of *Bombyx quercus*, L., var. *callunæ*, Palm, with the outer half of each wing devoid of scales, while the fringes were perfectly developed. Mr. Hall, a male specimen of *Lycæna bellargus*, Rott., from Folkestone, having the under side of the left secondary destitute of spots, the other wings being normal. Mr. Tutt, a large number of species of *Erebia* and allied genera from the Alps, and read a most interesting paper on their affinities, habits, and localities, making especial reference to the presence, absence, and development of the eye-like markings; he also said that he had taken a large number of *Zygæna exulans*, Hüb., some being of the semi-diaphanous Scotch form. Mr. Enock exhibited and described at some length the egg-parasite *Trichogramma evanescens*, which was only ½ mm. in length. He stated that he had made some 180 drawings of the various details of its history and structure, and called attention to the economic benefit of his observations if the farming of these minute creatures was carried out on a large scale.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*August* 19*th*, 1895.—Mr. G. T. Bethune-Baker, President, in the chair. The Secretary called attention to the fact that this was the 100th meeting of the Society. Exhibits:—By Mr. R. C. Bradley, a number of insects taken on Cannock Chase, at Whitsuntide, including *Leucorrhinia dulica* and other dragonflies; *Nomada ochrostoma*, *ruficornis*, *flavoguttata*, and other Aculeates, and some Lepidoptera. He also showed the specimens of a

Solenobia which he had taken this year with Mr. A. H. Martineau, and which Mr. Barrett had identified as *wockii*. By Mr. A. H. Martineau, *Myrmosa melanocephala*, one, from Sutton; *Anthidium manicatum*, one, from Bridgnorth; also a series of *Crabro dimidiatus*, which he had taken at Sutton, together with the insects they had captured, which consisted of four specimens of a *Dolichopus*, one *Scatophaga*, and two different Anthomizias. By Mr. P. W. Abbott, *Lithosia muscerda*, and *Nonagria brevilinea*, with its var. *alinea*, from Norfolk. By Mr. G. W. Wynn, a number of insects from Wyre Forest this year, including *Boarmia roboraria*, *Dipterygia scabriuscula*, and *Xylophasia monoglypha*, one quite black, one dark with a pale triangular patch on the inner margin of the fore wings. By Mr. Wainwright, for Mr. C. A. E. Rodgers, one *Aplecta occulta*, taken several years ago in Bagots Park, Staffs., on sugar; one *Heliothis* (*Chariclea*) *marginata* (*umbra*), from Malvern; and one *Zeuzera æsculi*, from Handsworth; also *Syrphus annulipes*, from a third locality, Lynton, in North Devon; this species, which he found for the first time last year near Stroud, has thus been now taken in three widely separated localities, and this makes the fifth specimen.—Colbran J. Wainwright, *Hon. Sec.*

Nonpareil Entomological Society.—*Sept. 6th*, 1895.—Mr. T. W. Jackson in the chair. The exhibits were as follows:—By Mr. Sampson, specimens of *Halia wavaria* which were bred in his garden at Dalston; black-and-white forms of *Abraxas grossulariata*, the yellow being entirely absent; pupæ (living) of *Chœrocampa elpenor*, the larvæ of which he found at Maldon, Essex, in August this year. By Mr. Norman, continental specimens of *Papilio podalirius* which he bred, some of them vividly marked (he mentioned that he had bred a great many specimens, and had failed to get any very marked variations); specimens of *Cynthia pernyi* and *cecropia* which were bred by himself; also some very interesting Coleoptera, amongst which were *Dytiscus marginalis*, *Hydrophilus piceus*, *H. colymbetes*, and *H. acilius*, taken by himself at Enfield, and which he said were very plentiful in that neighbourhood. By Mr. Gurney, specimens of *Ocneria dispar*, the males of which varied considerably in depth of colour. By Mr. Jackson, a magnificent variety of *Arctia caia*, which was of a cream colour with just a dark patch here and there on the upper wings; it was compared with Mosley's varieties, and is totally different from anything figured there. By Mr. Raine, a preserved larva of *Pyrella* which he found feeding on Dr. Allinson's food; it was webbed all round with the food. By the Secretary, some specimens of *Cataclysta limnalis*, *Hydrocampa stagnalis*, and *H. nymphealis*, which were captured round a pond at Woodford; he found that they were very plentiful, but rather difficult to get at, as they flew on the rushes just out of reach, and when they settled they would get as near the bottom of the plants as possible, and were difficult to dislodge. By Mr. Lurby, two specimens of *Catocala nupta*, which seems to be rather scarcer this season.—J. G. Craft, *Sec.*

Obituary.—We learn with great regret that Mr. W. H. Tugwell, of Greenwich, died on September 20th.

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MR. W. H. TUGWELL ON *ZYGÆNA EXULANS.*

By T. A. Chapman, M.D., F.E.S.

I send you an extract from a letter from my friend the late Mr. W. H. Tugwell, dated Sept. 10th, 1895, which has a melancholy interest as being perhaps the last entomological work he did. I ought to say that the letter was not, of course, intended for publication, and I have no right, perhaps, strictly speaking, to publish it; but I am sure Mr. Tugwell would not have objected, and no one will, I think, quarrel with me for doing so. Mr. Tugwell had always taken much interest in *Zygæna*, and especially in *Z. exulans*, and last year he asked me to get him some continental specimens, should I meet with it this year. I was fortunately able to do so, and had the pleasure of giving him a few specimens, and of seeing a long series of Braemar specimens in his drawers. My own impression was that the very finest Braemar specimens had a *Psyche*-like flimsiness that I have never seen in any continental specimens I have captured. A few specimens taken in the Tyro lwere perhaps as free from yellow or pale colouring as the Braemar forms, but they were denser and darker than the Scotch examples. Mr. Tugwell had not seen these at the date of his letter, and I am not aware that he has left any record of his opinion about them. Mr. Tugwell wrote :—

"I have carefully gone through the *Zygæna exulans* you so kindly brought me from Oberalp, and by daylight, and being set, they now show their characters well, and some of them, the females, are strikingly beautiful; I have never seen anything at all like them amongst the Braemar examples. All your specimens, when perfect, are very much more dense in the scaling, and, too, always much brighter in coloration, *i. e.*, the red is generally of a totally different tone, a tendency to show of a deep rose-colour instead of carmine; the colour of the Oberalp specimens in the spots of superior wings is uniform over the whole area of spots, whilst in the Braemar specimens these spots are never uniform in colour, but have a deeper centre spot surrounded by an ochreous tone on the outside of all the spots. But the most striking feature is that the males in the Oberalp specimens always show the pale collar, not so strongly as the females, but it always does show as a spot on each shoulder, at times only faintly, but still apparent; and the legs, too, in the males are whitish or yellowish, less so than in the females, but still pale, whilst in the Braemar specimens the legs are always black or nearly so on the top, paler beneath. I have never seen the slightest sign of a white or pale spot on the shoulder of a Braemar male, whilst the Oberalp specimens always show some white or yellow, so that in the most worn specimens you pick them out from Scotch by the Oberalp males having pale spots on the collar and legs paler than the Scotch males.

"I am certain that there is a great difference, readily recognisable by any one not prejudiced. *Not one* of the 120 odd specimens you kindly brought me would mislead me; not one could I pass as Scotch, unless so denuded of scales as not to be recognisable at all."

T. A. Chapman, Firbank, Hereford.

ON THE PROFUSION OF RHOPALOCERA IN THE ALPS AND THE RELATIVE PROPORTIONS OF SPECIMENS TO SPECIES.

By W. Harcourt-Bath.

In a former paper (*ante*, 247) I referred to the abundance of species of Rhopalocera which occurred in the Alps, in comparison with the number existing in most of the other portions of the Palæarctic area, even situated considerably further to the south. This has been brought about by reason of the central geographical position occupied by the region in question, combined with the considerable extent of surfaces existing at successive elevations above the sea level, which furnish a series of climatal conditions favourable to the growth of a great variety of vegetation suited to the different vertical or ascending zones. In sheltered valleys on the southern slopes of the Pennine and Lepontine chains we perceive the vegetation of Piedmont and Lombardy sufficiently austral in its general aspect, with its attendant olives, oranges, and evergreen shrubs, truly typical of the warm temperate region. At the northern base of the Alpine range, commencing also in equivalent zones upon the southern side, we pass successively in ascending climatal belts wherein flourish vines, maize, and tobacco; then walnuts and sweet chestnuts, beeches, oaks, and wheat; above them, forming a very broad belt, the great tract of conifers; then brilliant-coloured alpine flowers and lichens, until we arrive at the perennial snows of the higher mountain peaks. These represent isothermal differences as great as exist between Italy in the one direction and the polar regions in the other.

To the entomologist who has only been accustomed to collecting on this side of the English Channel, whose experience has been confined to no better fare than what the New Forest can afford, the Alps constitute a perfect El Dorado of butterfly abundance and beauty. It is true that the general facies of the rhopalocerous fauna does not differ so much from that existing in these humid isles, but the great interest accrues in the number of closely allied forms occurring there, side by side with the more familiar ones of our own woods, fields, and commons, thereby affording abundant material for the student of evolution and morphology, as well as a more extensive series of species for the collection. What does the British entomologist know, for instance, of such typical genera as *Erebia*, *Syrichthus*, *Satyrus*, *Melitæa*, *Chrysophanus*, with their miserable quota of 2, 1, 1, 3, and 1 species respectively, compared with their corresponding numbers in the Alps, namely 25, 7, 8, 11, and 10, in addition to as many more local races and well-marked permanent geographical varieties?

Compared with many parts of the tropics, however, the Alps of course constitute a poor collecting-ground as regards the number of species occurring upon them. But like most other portions of the Palæarctic area, what they lack in variety of forms and specialisation is fully made up in the great quantity of individuals of many species which exist upon their slopes.

It will be found a general rule, that the further we recede from the tropics the less number of species we are able to meet with; on the other hand the number of individuals increases, the differences reaching their extremes at the equator in the one direction and in arctic regions in the opposite. The Alps constitute no exception to this law, in fact they furnish a very good illustration of the subject under consideration. In the lower valleys which constitute the equivalent of the temperate zones by far the most species are to be found, but it is at the alpine elevations which represent the arctic regions of the horizontal isotherms where individuals generally abound to the greatest degree. It is perfectly astonishing with what profusion some species are to be met with in good localities upon the mountains, such, for instance, as *Pieris callidice*, *Colias phicomone*, *Chrysophanus virgaureæ*, *Melitæa didyma*, *M. dictynna*, *M. parthenia*, *Argynnis pales*, *A. niobe*, *A. amathusia*, *Cœnonympha satyrion*, *Satyrus cordula*, in addition to a great many species of *Erebia* and *Lycæna*. The conspicuous handsome crimson-ringed Apollo (*Parnassius apollo*), which is perhaps the most typical butterfly of the Alps, also abounds in many situations. A precisely parallel case is presented in the great elevated pseudo-arctic plateau in Scandinavia known as the Dovrefjeld.

We will now consider some statistics in support of the foregoing contention. The late Mr. H. W. Bates, who spent eleven years of his lifetime in the immense tropical forests of the Amazons, informs us that the number of species of Rhopalocera which he procured in the neighbourhood of Para was 700, their corresponding total in the Alps amounting to about 200. The number which constituted his daily "haul" fluctuated between 40 and 70, though upon several occasions it rose as high as 100. But the number of specimens he took of each species was exceedingly small, only averaging one or two apiece, with few exceptions. He in fact experienced extreme difficulties in securing a series of a great many species, to obtain which a good deal of patience and perseverance was required, even with those of average plentifulness. Almost every day new kinds would crop up, and often but a comparatively small proportion of those he captured the previous day would show themselves on the succeeding one, as the following extract from his diary will exhibit:—"On Tuesday, collected 46 specimens of 39 species. On Wednesday, 37 specimens of 33 species, 27 of which are different from those taken on the preceding day." He adds, however, that the number of specimens would be increased if he had reckoned all the commonest species seen. These data may be taken as fairly typical.

At Ega Mr. Bates obtained 550 species in the course of four years. In the Malay Archipelago Dr. A. R. Wallace says that any of the islands will produce from 150 to 250 species after a few months' assiduous collecting, and that 30 or 40 may be procured any fine day in good localities. The eastern equatorial regions, therefore, fall far short for richness when compared with their equivalents in the western hemisphere, where twice the number of species per day constituted the average capture of Mr. Bates; but it is probably the case that the proportion of specimens to species in the two regions is not the same, a greater percentage of the former possibly occurring in the Malay Islands than in the neotropical forests; but unfortunately Dr. Wallace has omitted to say anything on this score in his interesting work on the great 'Oriental Archipelago,' from which I have abstracted the preceding information.

Now in the Alps, as I have already remarked, a great many individuals *per capita*, on the average, seems to be the prevailing rule. In support of this I will furnish a few figures from my own personal observations. On the Riffel Alps above Zermatt I captured in the course of six hours 250 fine specimens representing about 20 different species, which gives an average of 12·50 apiece. This occurred at an elevation of some 8000 feet above sea-level, in the upper alpine zone above the belt of pine trees. At Randersteg, some 4000 feet lower, among the conifers, I netted 200 specimens one morning, representing about 35 species, which gives an average of about 6 apiece. Both events happened in the month of July, and may be taken as fairly typical of the relative proportions of specimens to species which can be obtained in the regions in question in comparison with their corresponding numbers in the tropical zones. The largest number of species which I have met with in a single day in the Alps is about 40 in the month of July, but the average appears to be considerably less, being somewhere about 30 for the lower and between 10 and 20 for the upper alpine region. In the South of England the three largest hauls which I have ever made occurred in the months of August, May, and July, upon which occasions I captured 21, 20, and 18 different species respectively; but the average generally falls far below these figures, even in the best localities. The percentage of specimens to species appears to approximate very closely to that occurring in the Alps in equivalent climatal zones.

I will now consider the causes which have produced the foregoing phenomena. In conformity with the theory of evolution by means of natural selection, it may be taken for granted that whenever a species is scarce its struggle for existence is very great; on the other hand, when it is plentiful it has not many enemies to contend with. In the tropics butterflies have many enemies to contend with in the shape of insectivorous birds, reptiles, batrachians, bats, dragonflies, spiders, besides a host of other parasites. Competition between closely-allied species must also be exceedingly great. These must all be providing plenty of scope for the play of natural selection, and thus new species will constantly be given ample opportunity of coming into existence. On the other hand, adverse climatal influences will have little effect in curtailing their numbers. Unlike the temperate regions of the earth, the tropics have, so far as we know, never experienced the ill effects of a glacial period, which has proved such a powerful agent in reducing the number of species which have from time to time established themselves within the sphere of its periodic influence. Species in the tropics have therefore been permitted to accumulate without any restraint of this nature for many thousands of years.

In the Alps, on the contrary, the number of enemies which prey upon butterflies is comparatively insignificant. In the surrounding plains reptiles, batrachians, and birds are pretty plentiful; but it is precisely here where the greatest number of species of Rhopalocera occur, which is in direct confirmation of my theory; while among the mountains, above a certain elevation, they are exceedingly scarce, Arachnida—which, by the bye, are eminently characteristic and abundant in the Alps—being the only enemies of any consequence. The same thing also exists in boreal regions. This, then, accounts for the superabundance of certain species, which are permitted to multiply without any check except what they receive from adverse climatal influences. At the same time this immunity from attack does not favour the rapid evolution of new forms. Climate is probably the most important factor in the production of new species in the Alps and in other portions of the Palæarctic area. To put the matter in a nutshell, great competition favours the evolution of species, while little competition produces individuals.

It may probably be admitted that nature always permits the production of the greatest number of individuals in a given area which are capable of existing in it, so that, all other things being equal, a new species can only come into existence by wholly or partially crushing out one or more other species. Competition generally being the greatest between closely-allied forms, those which are the most nearly related to it are in consequence principally affected by any change in the equilibrium. Supposing ten different species to exist in a certain district possessing an average of 1000 specimens apiece, which means that the locality is capable of supporting 10,000 individuals, the evolution or immigration of one new species would upset the former balance entirely, for then there would be eleven species, with a reduced average of about 909 individuals *per capita*, the total number, as I have remarked above, remaining the same. The addition of ten new species would give an average of only 500 to each, and so forth.

These, then, are the principal answers which, in my humble opinion, can be supplied in elucidation of the problems connected with the relative large percentage of specimens to species of Rhopalocera in the Alps in comparison with their proportions in the tropical regions of the earth.

Birmingham, October 18th, 1895.

CALLIMORPHA HERA IN SOUTH DEVON.

By W. Hewett.

Whatever doubts may have existed with regard to the genuineness of *C. hera* as a British species, there need be none as to its occurrence in South Devon at the present time. I have reliable evidence of more than one hundred specimens having been taken there this season, of forty-eight of which I have become the proud possessor. Twenty-five of these were taken by myself and two by my wife whilst in the district last August; the remaining twenty-one were all brought to me alive, mostly in a more or less bruised condition, and minus much of the "down" from their wings. Although in the district from the 8th to the 19th, I only devoted seven days to the species, spending the rest of the time in trips to Torquay, Babbacombe Bay, Dartmouth, Exmouth, Dawlish, Teignmouth, Powderham Castle and Park, not forgetting to mention a most delightful trip down the English Rhine, the Dart, from Totnes to Dartmouth.

C. hera was discovered in its present haunts by my friend Mr. William Brooks, of Grange Hall, Rotherham, who took the first specimen in August, 1882 (see 'Entomologist,' vol. xvii. page 233). It was he who first informed Mr. Jäger of its occurrence there, which will doubtless explain that gentleman's partiality for South Devon as a collecting-ground ever since.

Mr. Brooks very kindly supplied me with full details of how, when, and where to get *hera*, so that on my arrival no time was lost in "beating about the bush" for the locality. The late Major Still, of Seaton, Devon, had at first intended joining, but was unfortunately unable to do so.

I suppose it is hardly necessary for me to mention that the insect is to be obtained during the day-time by beating them out of the hawthorn-hedges, especially where there is an abundance of holly and ivy, as they show a decided preference for these evergreens. The next thing, after getting *hera* to take to flight, is to capture it, and this, in spite of all reports to the contrary, I did not find a feat difficult of accomplishment. Indeed, without wishing to pose as a "dead shot" with the net, for me to see the moth was in most cases to take it. Of those I saw I only missed three specimens, and I never had a fair chance with one of these. It is generally imagined that fine sunny weather is the best in which to beat out *hera*, but here again I must admit that such was not my experience, as during the first four days, which were all dull and showery—very showery—I had much better luck than during the remaining three, which were unusually fine and sunny; besides, the heat was at times oppressive, making working for it by no means an easy pastime, and I could literally say I obtained my series "by the sweat of my brow."

The Rev. Dobrée Fox, of Castle Moreton, Tewkesbury, informed me that *C. hera* flies between 8 and 10 a.m.; this, I believe, is its habit on the Continent, but was not my experience with it at Starcross, as, although generally on the ground by 9 a.m., I did not notice any so flying, and only heard of one which was seen flying over a turnip-field about noon, I believe, by Messrs. Mitchell and Robson, of London. Mr. Brooks also says that he never saw any specimens on the wing other than those which he disturbed.

The moth is pretty quiet when netted, and is not difficult to box, or "noisy" when in the box. I kept mine alive in 2-oz. chip pill-boxes until I reached my lodgings, without apparent harm to the insects, when the males were killed, and the females kept for eggs, which they deposited freely on the bottom and sides of the boxes, somewhat after the manner of *A. caia.* The eggs when first laid are primrose-coloured, but just before hatching they turn to a beautiful purple colour.

My specimens were first stupefied with chloroform, and then killed with oxalic acid. This is a method I can strongly recommend to all entomologists as being most satisfactory, leaving the insects operated upon beautifully relaxed and ready for immediate setting. Of the forty-eight specimens which I obtained, not more than six were in first-rate condition, and, owing to my sacrificing all the females for eggs (some obstinately refused to lay), my specimens, to say the least of it, are not so fine as they would have been if I had killed them as soon as captured; still, as the seventeen females from which I obtained eggs laid some 2261 eggs, or an average of 133 each, I suppose there is no reason for complaint. Very few of the eggs laid were infertile; some, although they changed colour, did not seem to have sufficient strength to break the shell, and so died without emerging. The eggs hatched in from thirteen to eighteen days; fourteen batches averaged fifteen days' duration in the egg state.

The young larvæ at once commenced to demolish their egg-shells, on which they seem to live for the first two or three days. I gave mine a variety of food-plants, but the majority preferred raspberry, which I supplied them with until October 2nd. Some of them I then sleeved on 12-inch pots containing a strong growth of dandelion, ground-ivy, plantain, and dock, also on healthy plants of ground-ivy which I had potted some time previously, and the larvæ are at present quite at home and doing very well. I have placed the pots in a room having a south-west aspect, and shall examine them on an average once a week until spring arrives. There will be neither fire nor gas in the room, so that a fairly even temperature will be maintained. The two essentials seem to be to keep them dry and not overcrowded. If the least crowded, they have not the slightest objection to eating their brothers and sisters, especially those that have just moulted. A correspondent informs me that of forty-five newly-hatched larvæ, he could only find thirty a few days after, and was quite sure that none had died a "natural death." Mr. Porritt lost a number last year through this cause after they had safely passed the rigours of a very severe winter, he having occasionally to thaw the larvæ.

The Rev. C. Benthal informed me that he had once taken the chrysalis of *C. hera* amongst some dandelion in his garden, and that he had on more than one occasion discovered the larvæ feeding on dandelion.

The following is a list of the food-plants, on all of which larvæ of *C. hera* will feed. I am inclined to think, from the habit this species has of resting on and amongst ivy and holly, that the larvæ will eat these plants, but I have not, so far, put them to the test:—Raspberry (*Rubus idæus*), dog rose (*Rosa canina*), hawthorn (*Cratægus oxyacantha*), dog mercury (*Mercurialis perennis*), comfrey (*Symphytum officinale*), common red nettle (*Lamium purpureum*), coltsfoot (*Tussilago farfara*), celandine flowers (*Chelidonium majus*), groundsel (*Senecio vulgaris*), ground-ivy (*Glechoma hederacea*), white dead-nettle (*Lamium album*), greater plantain (*Plantago major*), knotgrass (*Polygonum aviculare*), dandelion (*Leontodon taraxacum*), forget-me-not (*Myosotis palustris*), borage (*Borago officinalis*), viper's bugloss (*Echium vulgare*), lettuce (*Lactuca*). Of these, according to all accounts and my own experience, I should give first place to raspberry and knotgrass before hybernation; whilst for hybernating them on, ground-ivy, dandelion, and garden strawberry are the best; after hybernation, white dead-nettle and dandelion. Mr. G. T. Porritt, of Huddersfield, hybernated his on dandelion and garden strawberry, whilst Mr. C. Fenn, of Lee, brought his through the winter on ground-ivy. Both these gentlemen, I may add, were very successful. The larvæ have at first a certain amount of resemblance to those of *C. dominula*, and like to rest on the dead and shrivelled leaves of the food-plant.

Mr. Benthal said that, according to his experience, sixty was the average number of eggs laid by *hera;* those I obtained averaged 133 each, but this increase in the number of eggs is easily accounted for when it is considered that most of my females were in good condition, whereas when they are worn there is a great chance of their having deposited a part or the whole of their eggs. Still there is this to be said, that when worn they are more likely to be fertile than freshly-emerged specimens. Mr. Benthal also said that the earliest record for *C. hera* that he knew was July 29th of the present year, and the latest he had known was September 15th, 1894; and that during the four years he had been in the district he had obtained about forty specimens, or a few more, counting very worn ones, which at first he used to set at liberty, but afterwards kept for eggs.

As the result of numerous tête-à-têtes with the villagers, especially those of the "sere and yellow leaf," I learned that *C. hera* was formerly much commoner than at present. Many used to be attracted by the light (not a very brilliant one either) in the cottagers' windows, as many as three or four coming in one night, whereas now they did not see that number in a season. Although I do not share in the opinion expressed by some, that *hera* will shortly become extinct on account of being overworked, still it must be admitted that it is getting scarcer at its headquarters; but it is satisfactory to know that it is gradually spreading its range, and now occurs over a wide tract of country from Exeter to Teignmouth and Torquay, and will, when looked for, and, what is more, worked for, doubtless turn up elsewhere in the district, probably throughout the whole of South Devon. Mr. Porritt, whilst in the district last year from Aug. 20th to 30th, took twenty specimens, but the weather for the most part was very bad (Entom. xxx. 223). Mr. A. Jones, of Shrublands, Eltham, Kent, whilst at Starcross on Monday, Aug. 19th, took three specimens, two males and one female, all of the yellow variety *lutescens*, the female laying only five eggs. Mr. Gervase F. Mathews, of Dovercourt, Essex, who was also at Starcross on the 19th, did not take one. Although Messrs. Mitchell and Robson, of London, whilst at Starcross worked "light" several times, they failed to attract *hera;* nor could I hear of more than three specimens being so obtained this season.

On the evening of Wednesday, August 14th, I took two fresh-looking females, which I had captured that day, in a gauze cage to the ground in the hope of attracting a few males; but although I waited patiently, none came. I afterwards found that these females had been impregnated, as they each laid a number of eggs a few days afterwards which proved fertile. From my experience of "assembling," I am inclined to think that three or four newly-emerged females would attract a number of males, and strongly recommend this means to any entomologist who may hereafter visit the grounds. On August 18th, Mr. Benthal had a newly-hatched female in a breeding-cage out of doors. This was visited between 6.30 and 7.30 p.m. by a male, seen on three different occasions, and presumably the same. It was captured about 8 p.m., and put along with the female.

The following particulars will show, under their respective headings, the number of eggs laid by the various forms, *viz.*, orange, red, and yellow, when laid, date hatched, duration in the egg state, also the average number of eggs laid by the different forms, together with the total average for the three forms:—

Orange.

(1) 49 eggs; laid Aug. 14 and 15; hatched Aug. 30 and 31; in egg state 16 days.

(2) 163 eggs; laid Aug. 17, 18, and 19; hatched Sept. 3, 4, and 5; in egg state 17 to 19 days.

(3) 142 eggs; laid Aug. 17, 18, and 19; hatched Sept. 1, 2, and 3; in egg state 15 days.

(4) 228 eggs; laid Aug. 13, 14, and 15; hatched about Sept. 26 and 27.

(5) 75 eggs; laid Aug. 13, 14, and 15; eggs lost in transit through the post.

(6) 125 eggs; laid Aug. 16, 17, and 18; hatched Aug. 30 and Sept. 1, 2, and 3; in egg state 14 days.

Total orange form, 782 eggs; average 130 eggs each.

Red.

(1) 97 eggs; laid Aug. 13, 14, and 15; hatched Aug. 26 and 27; in egg state 13 days.

(2) 126 eggs; laid Aug. 10, 11, and 12; hatched Aug. 23 and 24; in egg state 13 days.

(3) 74 eggs; laid Aug. 17, 18, and 19; hatched Aug. 31 and Sept. 1 and 2; in egg state 14 days.

(4) 197 eggs; laid Aug. 13, 14, and 15; hatched Aug. 31 and Sept. 1, 2, and 3; in egg state 18 days.

(5) 44 eggs; laid Aug. 30 and 31, and Sept. 1; hatched Sept. 12, 13, and 14; in egg state 13 days.

Total red form, 538 eggs; average 107 eggs each.

Yellow.

(1) 44 eggs; laid Aug. 17, 18, and 19; hatched Aug. 31 and Sept. 1; in egg state 14 days.

(2) 214 eggs; laid Aug. 12, 13, and 14; hatched Aug. 26 and 27; in egg state 14 days.

(3) 198 eggs; laid Aug. 12, 13, and 14; hatched about Aug. 26, 27, and 28.

(4) 155 eggs; laid Aug. 13, 14, and 15; hatched Aug. 28, 29, and 30; in egg state 15 days.

(5) 254 eggs; laid Aug. 14, 15, and 16; hatched Aug. 31 and Sept. 1 and 2; in egg state 17 days.

(6) 76 eggs; laid Aug. 19, 20, and 21; hatched Sept. 5, 6, and 7.

Total yellow form, 941 eggs; average 156 eggs each.

Thus seventeen females averaged 133 eggs each, and fourteen batches of eggs averaged 15 days' duration in egg state.

Of the forty-eight specimens (20 males, 28 females) of *C. hera*, obtained by me near Starcross in August last, seventeen (8 males, 9 females) were of the red form, eleven (4 males, 7 females) were of the orange form, and twenty (8 males, 12 females) were of the yellow form.

Mr. C. Fenn, in a letter dated Sept. 9th, says:—"As pupation approaches put them into some sort of cage that has plenty of earth (at least six inches in depth), with a lot of mixed rubbish, like rotten wood and moss, as they like to spin deep down among such stuff; some of mine went down eight inches below the surface. Keep them fairly moist, and they will emerge at the end of June."

This fine and handsome species, so far as I have been able to ascertain, is very constant in its markings; but in addition to the *orange*, *red*, and *yellow* forms, referred to above, I have pleasure in placing on record, for the first time, particulars of three varieties, all of which occurred near Starcross; two of these I saw in the collection of Mr. Benthal.

No. 1. A very striking variety, having the usual creamy white line on the inner margin of both fore wings black instead of white. It was taken in 1891, and was the fourth specimen captured by Mr. Benthal, who found it flying in his garden; but unfortunately the central wire of his umbrella-net cut off its body, which subsequent search failed to detect. The specimen had evidently been in good condition when captured, but whether a male or female Mr. Benthal did not know.

No. 2. In this specimen the largest of the five black spots which occur on the hind margin of each fore wing was minus. It was the first specimen taken by Mr. Benthal this year. Mr. Benthal said he had seen one having the hind wings *white*. This was in 1891, and being unprovided with a net he managed to place his hat, a "mortar-board," over the insect, which, however, escaped whilst the reverend gentleman was endeavouring to box it, and departed "never to return."

Mr. C. G. Barrett, in his magnificent work, 'Lepidoptera of the British Islands,' does not mention any varieties of *hera*, but says that the first recorded specimen was captured at Newhaven, Sussex, in 1855; and that it was taken at Dawlish in 1881.

During the seven days I was working for this species, I only went out once without getting it; whilst on Tuesday, August 13th, a very windy and showery day, I got eight specimens. This I believe to be the highest number yet taken by one collector in a day. On Wednesday, August 14th, I got six. But these of course were red-letter days.

Other species noticed, whilst at Starcross and in the immediate neighbourhood, were as follows:—*Vanessa io*, *V. atalanta*, *V. urticæ*, *Lycæna agestis*, *L. argiolus* (the latter beaten from holly); *Pieris brassicæ*, *P. rapæ*, *Satyrus ægeria*, *S. megæra*, *S. tithonus* (were very common), *S. ianira*, *Polyommatus phlœas;* full-fed larvæ of *Sphinx ligustri*, *Calligenia miniata* (in fine condition); *Lithosia lurideola*, *Gnophos obscurata* (the dark form), *Ephyra porata*, *Acidalia imitaria*, *A. emarginata*, *A. bisetata*, *Cabera pusaria*, *Aspilates citraria.* I was much astonished at beating out occasionally my old friend *Abraxas grossulariata* in good condition; I had bred some 1200 specimens eight weeks earlier at York, distant 300 miles. *Larentia olivata* (common, mostly worn, although some lovely specimens were seen), *Melanthia ocellata*, *Melanippe rivata*, fine *M. subtristata*, *M. galiata*, *M. fluctuata*, *Coremia unidentaria*, *Cidaria picata* (one specimen only, worn), *Anaitis plagiata*, *Eubolia mensuraria*, *Camptogramma bilineata*, *Phibalapteryx lignata*, *Eubolia lineolata* (common, but worn), *Bryophila glandifera* (a typical specimen at Starcross, and a yellowish form at rest on the sea-wall, Teignmouth), *B. perla* (common), *Xylophasia polyodon*, *Luperina testacea*, *Mamestra brassicæ*, *Triphæna orbona*, *T. pronuba*, *Noctua plecta*, *Phlogophora meticulosa*, *Plusia gamma.*

The insects enumerated above were all either beaten out of the hedges whilst working for *hera*, or else seen on the wing, and none were worked for specially. With the exception of one night at "light," with Messrs. Robson and Mitchell, and another trying to "assemble" with *hera*, I did no night-work, as I had taken very little "moth tackling" with me, excepting what would be necessary for *hera*, which I meant having "coûte que coûte."

In conclusion I wish to thank most heartily Messrs. Brooks, Porritt, and Fenn for much useful information.

York, October, 1895.

OBSERVATIONS ON *EREBIA ÆTHIOPS* (*BLANDINA*).

By J. C. Haggart.

Happening to reside in an extremely favourable locality, I have for the past few years made the study of this interesting northern butterfly an especial one. I think nothing can be more exhilarating to the entomologist than to make an excursion on a fine sunny day in July or August to the domains of this insect.

Immediately after emergence, *Erebia blandina* presents a beautiful appearance, the wings having a lovely velvety bloom on them, almost beyond compare. This fine complexion unfortunately disappears in a few days, however, and tends to greatly reduce the original beauty of the insect.

The haunt of *E. blandina* is almost without exception the margin of a plantation or wood where the different species of the *Poa* grow abundantly, and always situated in such a position as to receive the first rays of the rising sun. This last-mentioned fact is so plainly evident that the least observant cannot fail to notice it. The insect is truly sun-loving, and no collector need go in search of it with any thought of success if the day be dull.

It is most interesting to observe the extreme sensibility of the insect to shine and shade. A very good day wherewith to illustrate this is one when heavy clouds at intervals obscure the sun; the moment it disappears so also does *E. blandina*, and no sooner does it shine forth again than, as if by magic, scores of the insect are on the wing.

The under side of the insect bears a marked resemblance to that of a dead leaf, and I have often watched the males being deceived by withered leaves lying amongst the moss. They would flutter down quite close to the leaf, immediately rise with a disappointed air and fly a little further, only to be deceived again and again.

The ova are deposited amongst the *Poa*-grass and hatch in September. Towards the end of October the larvæ go down and hybernate throughout the winter and spring, coming up to feed again in May; they are generally full-fed about the end of June; the insect appears in July or August.

The larvæ are nocturnal feeders, coming up to feed on the grass just about dusk. The method of procuring the larvæ is by no means enviable even to the most ardent entomologist, as in the uncertain light it necessitates crawling on one's hands and knees amongst the grass, and there is always the risk of grasping those little brown slugs in mistake, which resemble the larvæ very much in shape and colour. No artificial light can be used, as the larvæ immediately drop down amongst the grass if this is done. The only alternative therefore is to use one's eyes to the best advantage until the darkness makes that impossible.

They are not difficult to rear in confinement if the larvæ are kept properly supplied with fresh food.

Galashiels.

ORKNEY LEPIDOPTERA.

On his return from Orkney, Mr. McArthur was good enough to show me the collection of Lepidoptera which he had made there during the past season. Unfortunately I was unable, from want of time, to make a thorough examination of the species in detail, but the following notes on some of the "macros" may not be uninteresting:—

Six species of butterflies were seen. *Pieris brassicæ*, common. *P. rapæ* was seen flying about the streets in Stromness. *Vanessa urticæ*, one specimen was seen on the cliffs at Hoy. *Epinephele ianira*, one specimen taken. *Cœnonympha typhon* (*davus*), rare. *Chrysophanus phlœas*, one specimen occurred at Hoy.

Nemeophila plantaginis.—In the males there is a good deal of variation in the size of the yellow markings on the fore wings, and in the females the yellow on hind wings in many specimens gives place to red with a complete absence of marking on the basal half, this being entirely black.

Hepialus humuli.—The specimens of this species do not vary in the direction of that exhibited by Shetland examples, except that the thorax is rather dark.

Xylophasia monoglypha (*polyodon*).—Only about half a dozen specimens were seen altogether, and of these only one is of the melanic form so frequent in Scotland.

Agrotis vestigialis (*valligera*).—Some of the specimens are richly marked, and the ground colour is rather brighter than in English examples.

A. cursoria. — All the usual forms are exhibited, but the prevailing colour of the fore wings is brownish grey, varying in one direction to whitish grey, and in the other to a reddish brown. In one female example the colour is dark greyish brown with a broadish grey outer marginal border; transverse markings absent.

A. tritici.—Not nearly so common as *A. cursoria;* all the specimens have a subcostal streak, and in a few the transverse markings are very faint. *A. aquilina*, which is sometimes considered to be a form of *A. tritici*, was not represented in the collection.

Noctua festiva.—A very extensive and highly variable series of this species was obtained. Among the numerous aberrations are four remarkable forms. One of these is dark chestnut with a dusky basal patch, central shade, and outer marginal band; the stigmata inconspicuous. Another is brown with grey outer margin. A third specimen is pale grey with a dusky central fascia and band beyond. The fourth is brownish with velvety black spots before the orbicular and between that and the reniform; a blackish shade from reniform to inner margin; also a band beyond.

N. xanthographa.—Only three specimens, one red-brown with a whitish reniform.

Triphæna comes (*orbona*).—The only form observed was the dark one known as var. *curtisii*.

Epunda lutulenta.—A very splendid series of this species was taken, all in grand condition as they were found just emerged from pupa. The grey form with dark fascia (var. *sedi*) is largely represented. Another form is blackish with a darker fascia not always clearly defined.

Tæniocampa rubricosa.—Varies in colour from grey to dark reddish brown; some of the specimens are brown suffused with silvery grey; others are prettily variegated.

Hadena adusta. — Not common. Among the specimens brought back is one example which is almost entirely velvety black.

Larentia flavicinctata (*ruficinctata*).—Only met with in Hoy, where it was rare. The fulvous colour in the specimens is brighter than in Scotch mainland examples.

Thera juniperata.—The majority of the specimens have a black or blackish basal patch and central fascia; the latter is entire. Only a few examples are of the ordinary type.

Hypsipetes sordidata (*elutata*).—A very long series exhibiting an extraordinary range of variation. Many of the specimens fuliginous, but none really black. One curious example is blackish with reddish basal patch and central fascia; on the outer margin there is a conspicuous white spot. Another is olive-brown in colour, with blackish markings consisting of a subbasal fascia, an angulated one beyond, a central fascia bifurcated above the middle and the ends approximating on costa, and a broadish submarginal band. The series was reared from larvæ found feeding on stunted sallows.

Coremia munitata.—The specimens are very suggestive of *C. designata* (*propugnata*) in the style of marking, although the colour is more or less typical.

Melanippe montanata.—In some examples the fascia is exceedingly faint, and the two black spots consequently stand out prominently; but beyond this there is little of importance in the way of variation.

Cidaria truncata (*russata*).—I think I am right in the determination of this species, but it must be admitted that many of the specimens have a very suspicious resemblance to certain forms of *C. immanata*, especially those with a clearly defined black central fascia.

A full list of the Macro-Lepidoptera previously recorded from Orkney will be found in the 'Entomologist,' vol. xxi. pp. 28–30 and 98, 99. The recent additions made by Mr. McArthur are:—*Vanessa urticæ, Epinephele ianira, Chrysophanus phlœas, Agrotis vestigialis, A. cursoria, A. tritici, Noctua rubi, Pachnobia hyperborea, Xanthia citrago, Dianthœcia nana, D. cucubali, Dasypolia templi. Selenia lunaria, Numeria pulveraria, Larentia multistrigaria, L. flavicinctata, Eupithecia pulchellata.*

Richard South.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY'S EXHIBITION.

The Annual Exhibition of this Society was held on October 17th, at St. Martin's Town Hall, Charing Cross, and was much appreciated by the company who came to see the choice and beautiful specimens which had been tastefully arranged by the Committee.

It may be well to mention that the object of the Society is to popularize the study of Natural History, and to promote this it holds meetings twice a month, at which papers are read, discussions take place, observations are communicated, and specimens shown and commented on. In the summer time, field meetings are held for the purpose of collecting and observing; and periodically, admirable and attractive exhibitions, such as the present one, are promoted. The Society's rooms are at Hibernia Chambers, London Bridge, where a large Library and typical collections are kept for members' reference, as well as a lantern for demonstration purposes. At present the number of members is about 200, and the annual subscription is only 7s. 6d. The Secretary is Mr. Stanley Edwards, Kidbrooke Lodge, Blackheath.

In the British section, the President, T. W. Hall, Esq., exhibited a large and valuable collection of butterflies and moths, including a long series of *Chrysophanus dispar*, now extinct, a series of the rare *Lycæna arion*, a fine series of another extinct fen insect, *Noctua subrosea*, a fine set of *Eupithecia*, and the life-history of *Sesia sphegiformis*. Mr. R. South, life-histories of a number of species. Mr. Hamm, a large number of rare varieties taken round Reading. including a diaphanous *Melitæa aurinia*, a very dark *Lithosia lurideola*, a grand series of *Xanthia aurago*, many specimens of both *Psyche opacella* and *Fumea intermediella*, with cases at different stages of growth. Mr. Jäger, an extremely perfect series of *Callimorpha hera*, with its var. *lutescens* and the intermediate terracotta form, and also a beautiful series of *Spilosoma lubricipeda*, with vars. *radiata* and *fasciata*, and intermediate forms. Mr. H. W. Barker, a fine series of Arctias, and a drawer of several species of Lycænidæ, showing many beautiful variations. Mr. H. Mitchell, a case containing distinct and striking varieties of 14 species, including an entirely fulvous *Epinephele ianira*, a suffused var. of *Vanessa urticæ*, a melanic specimen of *Papilio machaon*, a banded *Chrysophanus phlœas*, and a coalesced form of *Zygæna lonicerœ*. Mr. C. H. Williams, a beautiful banded form of *Cheimatobia boreata*, a melanic form of *Oporabia dilutata*, and a specimen of the same species with yellow ground colour. Mr. J. H. Carpenter, his collection of *Argynnis*, *Melitæa*, and *Vanessa*, including white-spotted forms of *Argynnis paphia*, and a male approaching the *valesina* form. Mr. Hy. Tunaley, a case showing the protective resemblance of *Lobophora viretata* to its resting-places on holly stems and leaves. Mr. Hy. J. Turner, some 74 species taken in his garden near Nunhead Station. Mr. McArthur, some fine specimens of Lepidoptera. Mr. H. A. Auld, a bred series of *Callimorpha hera*, a fine series of *Nola albulalis*, and a white var. of *Lomaspilis marginata*. Mr. J. A. Clark, a series of the extinct *Lælia cœnosa*, a *Bombyx rubi* without the transverse lines, a white-banded black form of *Abraxas grossulariata*, a striking var. of *Oporabia dilutata* having a very dark band on a very light ground, a uniformly black var. of *Larentia cæsiata*, nearly white specimens of *Lomaspilis marginata*, and a new instrument invented by himself, consisting of a lens on an adjustable arm and stand, to aid in the setting of minute insects. Mr. C. G. Barrett, a long and varied series of Zygænidæ, Nolidæ, Psychidæ, Amphydasidæ, Boarmiidæ, and Zanthias, among which were specially to be noted a complete series of *A. betularia*, and var. *doubledayaria*, with intermediate forms, series of all the rare and curious species of *Psyche*, black *Tephrosia biundularia*, and a fine series of the rare *Nola albulalis*. Mr. Merrifield, a number of species which had undergone changes brought about by artificially increasing or decreasing the temperature during the pupa stage. Mr. R. Adkin, a fine set of specimens taken in the island of Hoy, Orkney, during 1895; an almost complete collection of Sesiidæ, arranged to show their peculiar method of pupation; and a collection of the genus *Triphæna*, including a series of *T. comes*, containing many interesting varieties, especially from N. Britain. Mr. J. W. Tutt, a number of drawers of species from his well-known and large collection. Mr. Chittenden, some very fine varieties of Noctua. Mr. Percy Bright, a grand series of *Hepialus humuli* from N. Britain, containing many remarkable varieties, together with other rare species and forms.

In foreign Lepidoptera there were numerous and splendid exhibits. Mr. A. H. Jones exhibited some very fine bred series of Rhopalocera from South Europe, including *Thais cerisyi* with a very dark female, *T. polyxena* and its var. *cassandra*, *T. rumina* and its var. *medesicaste*, series of *Euchloë belia* and its var. *ausonia*, series of *E. tagis* and its var. *bellezina*, and a very fine series of *Leucophasia duponcheli*, with its summer form var. *æstiva*, all in the very finest condition. Mr. McArthur, a case of East Indian Papilios. Mr. Henry J. Turner, African Papilios and Danainæ. Mr. Leech, a fine collection of Palæarctic Vanessidæ and Argynnidæ; also a selection of Palæarctic Bombyces, Noctuæ, and Geometræ, the series of many of the species comprising specimens from England, and also from Japan and other places in Eastern Asia. Mr. W. A. Pearce, about 150 species of Sphinges, Bombyces, Noctuæ, and Geometers captured by himself in Pennsylvania and Colorado. Mr. W. Mansbridge, many fine Rhopalocera from the United States; the seasonal forms of *Colias eurytheme*, the Papilios, and the protective resemblance of *Anæa andria* to a dead leaf being especial features. Mr. A. Hall, grand cases of Palæarctic and Nearctic Argynnidæ, South American Catagramminæ and Oriental Nymphalidæ. Mr. Stanley Edwards, a large and valuable collection of Ornithoptera and Papilio from all parts of the world. Mr. O. Janson, Ornithoptera and Hepialidæ.

Among the Coleoptera shown, Mr. W. West (Greenwich) sent almost complete series of Cicendelidæ, Carabidæ, and Dytiscidæ, as well as very fine specimens of the genera *Chrysomela* and *Aphodius*. Mr. B. G. Rye, cases containing representatives of the families and genera of British Coleoptera. Mr. O. Janson, a case of the largest species of Coleoptera from various parts of the world.

Mr. T. R. Billups exhibited his inimitable collection of Ants, Bees, and Wasps, a fine set of British Hemiptera, and a large number of life-histories of parasitical Diptera and Hymenoptera with their lepidopterous hosts. Mr. A. Beaumont, a collection of Diptera. Mr. J. T. Carrington, a number of plants having insect-galls upon them. Mr. Auld, a hornets' nest.

Mr. Stanley Edwards kindly lent a series of diagrams showing the life-history of typical species of the various sections of Insecta and Crustacea.

In the Orthoptera, &c., Mr. C. A. Briggs exhibited a collection of the British species, nearly complete, and living specimens of the recently naturalized cockroach, *Periplaneta americana.* Mr. W. J. Lucas, specimens of *Æschna juncea* and *H. cyanea* taken *in copulâ* at Bournemouth. Mr. Ashdown, local species and varieties of *Odonata,* including *Gomphus vulgatissimus* and an intermediate var. of *Calopteryx virgo.*

Microscopes were lent by Messrs. W. West, E. West, F. E. Filer, J. W. Hardy, H. Cooper, A. W. Dennis, W. Turner, C. West, W. Burton, H. G. Coombes, T. W. Brown, and Mrs. Brown, and a number of beautiful objects were shown and much admired.

Mr. R. Adkin showed entomological works; and Mr. A. E. Pearce, a book of designs in water-colours, being studies of plants by himself.

Mr. Enock gave one of his attractive lectures, aided by the lantern, on "Insect Architects," and the musical arrangements were admirably carried out by Mr. W. Latter, R.A.M., and a few friends.—Hy. J. Turner, *Hon. Report Secretary.*

NOTES AND OBSERVATIONS.

Exhibition of the South London Entomological and Natural History Society.—The Thirteenth Exhibition of this Society was held at St. Martin's Town Hall, Trafalgar Square, on Oct. 17th last, and was evidently a great success. Not only was this so as regards the extensive and varied character of the material brought together, which was in the highest degree both interesting and instructive, but also from the fact that the attendance was a large one. On this occasion those on whom the arrangements mainly devolved had a much larger space than formerly at their disposal; but the result proved in a very satisfactory manner that they were quite able to utilise this to the fullest advantage. Entomology, especially the Order Lepidoptera, was well represented, and the Hon. Secretary's Report on exhibits in this department will be found on page 300.—Ed.

Grease in Moths.—This being the greatest trouble I have had with my collection, I have tried nearly every remedy that has been suggested. While studying Dr. Guard Knaggs's remarks on this subject, however, I noted that he considered that grease was practically the result of decomposition, and the thought occurred to me that criminals were buried in quick-lime to prevent ordinary decomposition. Wondering how slaked lime would act, I got some, powdered it up finely, and put it in a box, resting the wings of some "greasy" subjects on it. I covered the bodies, having first cut off a portion of the underside, and extracted as much of the contents as possible. When this was done early it cleaned them better than anything else I have tried, as when the grease is absorbed, and the body is well dried, a camel-hair brush removes the lime nicely, and you can finish off by brushing upwards. The lime does not seem to harm the wings or pins at all that I can see; but unfortunately I have not the time to experiment as fully as I could wish. If lime has not been tried before, I should like some of our professors to try it, and give us the results. It certainly stops the grease spreading any further, saves entirely the unattacked parts, and greatly improves the rest. It is clean, cheap, and easily used; a week being enough for a new subject, older cases take longer.—J. T. Fountain; 58, Darwin Street, Birmingham, Oct. 18th, 1895.

Senses of Insects.—Mr. Jefferys' note on the hearing of insects (*ante*, p. 278) reminds me of an incident that came under my notice which may be worth relating. As I was sandpapering some cork for entomological purposes in the quiet hours of the night some time ago, I saw a cricket, *Acheta domestica*, coming towards me. I stopped sandpapering, the cricket stopped; moved, the cricket ran away; resumed my work, the cricket returned. I repeated it two or three times, and at last it came so near to me that I was able to catch it. From this it seems that although crickets have ears, which I understand are situated in the tibia of the front legs, they are not able to distinguish between the noise made by sandpapering cork and that produced by themselves. This is but a single instance it is true.—F. Milton; 184, Stamford Hill, N.

Pieris rapæ in New Mexico.—I had hitherto seen this in New Mexico only at Santa Fé; but lately Miss Lee showed me an example caught in the vicinity of Albuquerque, she thinks last summer. In this country we look upon a new locality for *P. rapæ* with much interest, while nobody thinks of troubling to run after *Vanessa antiopa*, one of our commonest butterflies.—T. D. A. Cockerell; Las Cruces, New Mexico, U.S.A., Sept. 14th.

A Note on the Lepidoptera of Middlesex.—'Harrow Butterflies and Moths' (vol. i., by J. L. Bonhote and W. C. Rothschild), published by the Harrow School Scientific Society, adds several species not, I think, included in the "Preliminary List of the Insect Fauna of Middlesex" (Entom. xxiv., xxv.), and in my own, and other records, in the 'Entomologist' (xxvii., xxviii.). With a view to further completing the county list, I have made a note of those species which now appear for the first time, though two sets of observations, those of Col. Hanbury-Barclay and Mr. F. Bond, belong apparently to the forties and fifties. Besides these, the authors quote freely from Mr. Melvill's 'Flora of Harrow,' the date of which is given as 1874. Mr. Cockerell also mentions this publication, but the edition he used was that of 1867. Possibly the notices now before me, and not in Mr. Cockerell's list, were made in the intervening years 1867–1874. Of the Rhopalocera Mr. Rhoades-Smith has discovered a locality for *Leucophasia sinapis*, whose claim to rank as a Middlesex insect has hitherto been based upon Mr. Mera's single specimen at Chiswick (Entom. xxiv. 119), while the same collector also reports *Colias hyale* taken in August, 1892. *Thecla rubi* (a single-specimen record) has turned up again at Wealdstone, while *Satyrus semele* and *Melitæa aurinia* have also been caught in the neighbourhood. *En passant*, I am myself glad to supplement a previous notice of *Thecla w-album* (Entom. xxiv. 65) with a second capture this year at the identical spot where it was found in 1887. Among Heterocera the novelties communicated by Mr. Sydney Webb, the possessor of the late Mr. Bond's collection, as taken within the radius of Harrow, are *Hepialus sylvanus* and *Brephos notha*. Those mentioned in Mr. Melvill's book are *Anarta myrtilli* and *Aventia flexula;* while Col. Hanbury-Barclay is responsible for *Calæna haworthii*, *Xylina socia*, and *Hecatera chrysozona*. Of modern interest are *Nola confusalis*, *Lithosia mesomella*, *Asphalia ridens*, and *Agrotis aquilina*, which have fallen to the share of Mr. Rhoades-Smith during the past year or two; *Pœcilocampa populi* (not uncommon), and, most remarkable of all, a single *Bryophila muralis*, taken by Mr. Bonhote on the School Chapel in July, 1892. The first volume ends with the Noctuæ; but a second, dealing with the Geometræ and the rest of the macros, as well as micros, is, I understand, shortly to be issued. Altogether the number of butterflies recorded is forty-one, a very respectable total when it is considered that the localities worked are nowhere more than fourteen or fifteen miles from the Marble Arch. The older entomologists are agreed that Middlesex, entomologically speaking, was once a happy hunting-ground indeed for the London collector. The more ancient of the notices in Newman and elsewhere would appear to support the tradition. But after all our insect fauna to-day compares very well with that of many a county which the jerry-builder and the speculative contractor have not yet converted to the uses of modern civilization. Above all it is most satisfactory to read that insects long since believed to be extinct so far as the north metropolitan area is concerned, still linger with us, and contrive to hold their own.—H. Rowland-Brown; Oxhey Grove, Harrow Weald, Oct. 12th, 1895.

Larvæ of Acronycta psi.—With reference to Mr. Allworthy's note on early larvæ of *A. psi* (*ante*, pp. 229–230), I should like to state that I came across full-fed larvæ of this species on July 4th (one) and July 6th (two). Of these, two pupated the day after I took them, and the other was "stung." On August 15th, 1894, and on August 28th, 1895, I took freshly-emerged imagines of *A. psi*, and a few days ago I saw several larvæ not yet full-fed. These facts would certainly seem to suggest that there is a partial second brood of *A. psi;* I say partial because, firstly, the August imagines are not so common as in May; and secondly, the pupæ from my July larvæ, though perfectly healthy, have not emerged, and are evidently lying over till the spring.—T. B. Fletcher; 78, Thornlaw Road, W. Norwood, S.E., Oct. 20th, 1895.

Autumnal Feeding of the Larva of Argynnis paphia.—In the autumn of 1893 I recorded (Entom. xxvi. 320) the occurrence of the autumnal emergence of *A. paphia*. I am again able to report upon this unusual habit of the species. A large number of ova from a normal female hatched the beginning of last August, and all the larvæ excepting one entered into hybernation immediately, and remain in that state, which is natural to the species. Examining the plant of *Viola* (upon which the brood are confined) on the 13th inst., I was surprised to find a larva in its last stage almost fully-grown, while all the others were hybernating, and the majority close to the shells of the ova. It seems remarkable that certain individuals should divert from the general habit of the species in this way. Are these instances forerunners of a future second emergence which this and allied species will adopt; or possibly they may be lingering examples of a second emergence of the past? I recorded a similar case in the same volume of *A. adippe*.—F. W. Frohawk; Oct. 1895.

Stauropus fagi Double-brooded.—When on a larva-beating expedition in the Poprad Valley in April, 1893, Herr F. Achille obtained a freshly-emerged male of *S. fagi*, but though working with much assiduity no others were met with that spring. In May, 1894, however, in the same district, a female was found which laid fertile eggs, indicating that males had emerged earlier. Sixteen eggs only were deposited, which hatched on the 21st to 23rd of May; and five went into pupa; the imagines duly emerged the first week in August. The author's conclusions as to the normal double-broodedness of *fagi* in a state of nature are borne out by Wirchratski, who found very small and also full-fed larvæ on oak in September, 1884, which pupated and emerged the following spring. It thus appears tolerably certain that *fagi* has normally two broods in South-eastern Europe. (F. Achille, in 'Societas Entomologica,' Nos. 1 and 2, 1895.)—W. M.

Agrotis ripæ, var. obotritica.—The larvæ, which hide in the sand by day, may be obtained at night by searching the food-plant with a lantern. It is to be met with on saline plants, such as *Salsola kali*, *Cakile maritima*, *Atriplex maritima*, &c., in the month of August. During the day the larva may be found by gently scraping away the surface of the dry sand in the neighbourhood of the food-plants. The larvæ are very variable. Although this variety bears considerable resemblance to the type, it may be readily separated from it. *Obotritica* is rather larger in size, and varies from a clear white ground, with scarcely visible markings, to darker, and with more distinct markings. The author mentions that it is still regarded as doubtful whether it is not a distinct species, or even whether several species are not included under the name *obotritica*, an opinion also expressed by F. Schmidt, the discoverer of this variety. (J. Speyer, in 'Societas Entomologica,' No. 3, 1895.)—W. M.

Sugar in 1895.—Having sugared almost every night during June, July, and August in a large garden and shrubbery, I was able to note changes from day to day. Finding the garden very productive, I only worked in the woods about half a dozen times, most of which proved complete failures. Uutil June 13th insects came fairly well, after which nothing would persuade them to leave the raspberry-flowers, where they swarmed every night until the flowers ceased blooming about the 28th. I have no doubt that honey-dew must also have been attractive about this time, as two nights in the woods resulted in only three insects. On the 28th, in spite of a very high wind and cold rain, sugar was very productive, and continued so until the limes came into flower about July 8th, when scarcely an insect could be found, except by working the flowers. This state of things lasted until the limes were quite over on July 22nd, when sugar was once more attractive, and continued so until I ceased using it on September 4th. Throughout August, sunflowers (which were in close proximity to the sugared trees) attracted many insects, although *Agrotis nigricans* and *Noctua* *stigmatica* (*rhomboidea*) were the only two which showed a decided preference for the flowers.—J. H. D. Beales; West Woodhay, Newbury, Oct. 14th, 1895.

Cannibalism of the Larva of Cerastis vaccinii.—Towards the end of May this year, I beat two larvæ of *Cerastis vaccinii* off elm, and kept them in the same pill-box. One of these larvæ was larger than the other, and was preparing to change its skin when I found it, and did so about two days after. And then a tragedy happened: the smaller larva disappeared; the larger must have eaten it up, for the pill-box was a perfectly sound one, so that it could not have escaped. Is it generally known that these larvæ are cannibals?—J. F. Bird; Rosedale, 162, Dalling Road, Hammersmith, W., Sept. 10th, 1895.

Mr. J. E. Robson's Sale continued.—The concluding portion of Mr. J. E. Robson's collection, including the Geometræ, Crambites, and Tortrices, was sold at Stevens's sale-rooms on the 22nd of October; as the condition of the specimens was poor, prices ruled low. Two lots of *Abraxas grossulariata* were perhaps the pick of the collection; the first, comprising a very fine light variety, with five dark forms, fetched 28/-; the second, some nice light varieties, together with a white-banded black specimen, 32/6. In the *Eupithecia*, two lots, each containing six *Eupithecia consignata* (with others), realised 17/- and 16/-; two ditto of four and five specimens each of *E. stevensata* (with others) from Mr. Sydney Webb 14/- and 15/-. A lot of ninety-six *Melanippe biriviata*, *M. montanata*, *M. fluctuata*, &c., including forms from the Hebrides, made 22/-; and a lot of *Cidaria suffumata*, with var. *piceata* and *porritti*, with two very poor *C. reticulata*, 25/-. Two pairs of Mr. Christy's *Nyssia lapponaria* were also included in the sale, but were, I believe, bought in at 40/- and 42/- respectively.—Thos. Wm. Hall.

CAPTURES AND FIELD REPORTS.

Eugonia autumnaria, &c., in Kent. — In September last, while spending a few days at Hythe, I had the pleasure of taking a female specimen of *E. autumnaria* (= *alniaria*), resting on the rail of a street lamp; it has deposited a few eggs. I also met with *Xanthia gilvago*, *Xylina semibrunnea*, and *Polia flavocincta*. At Deal I took one specimen of *Vanessa c-album* on the Michaelmas daisy. *Aporophyla australis* was common at sugar, and *Xylina ornithopus* (= *rhizolitha*) was just appearing. —W. Dannatt: Ivydene, Westcombe Park, S.E., Oct. 10th, 1895.

Phorodesma smaragdaria emerging in Autumn.—On Aug. 31st I went to the Essex marshes for the larvæ of the above species, and among the several dozen which I found was one which appeared to be very large and, as I supposed, nearly full-grown. It pupated on Sept. 4th, and on the 26th the perfect insect emerged. It is interesting to find a larva full-fed in the autumn, as it raises the question whether a second brood may not sometimes occur.—Hy. J. Turner; 13, Drakefell Road, St. Catherine's Park, S.E.

Catocala nupta in Worcestershire.—While collecting in Wyre Forest, Worcestershire, during the latter part of September, I had the pleasure of taking a specimen of *C. nupta* at sugar. I do not recollect to have heard of this species having been previously taken in Worcestershire.—H. Taylor; 682, Coventry Road, Birmingham.

Catocala fraxini in Kent.—I have great pleasure in recording the capture of *C. fraxini*, male, in the neighbourhood of Folkestone, on the sugar on a willow tree. It is nearly four inches across the wings, and is in fair condition.—W. J. H. Simmons; 68, St. Michael's Street, Folkestone.

Xylina semibrunnea and X. petrificata.—These two species of *Xylina* have occurred at sugar and ivy blossom in this neighbourhood somewhat commonly for the last three years. Can any of your readers inform me whether *X. conformis* has been taken in Great Britain since 1859, and if so, when and where the capture was made, and by whom?—B. S. Chope; Colyford, Devon.

Leucania albipuncta at Folkestone.—On Sept. 7th I renewed my acquaintance with *L. albipuncta* by the capture of a specimen, on sugar, at Folkestone. In six years, 1873–9 (omitting '78), I took nine individuals at the same place, but never more than two in a season.—Chas. Oldham; Woodford, Oct. 10th, 1895.

Polia flavicincta in the North.—Mr. Shepheard-Walwyn says (*ante*, p. 281) he found this moth at Scarborough, and believes it is not often met with so far north. The moth is fairly common in my garden here. In most years I find several, and have also bred them from larvæ feeding on various garden plants. I have not observed one this year, but have been from home.—G. J. Meynell; Durham.

Deiopeia pulchella.—Mr. G. C. B. Miesille reports the capture of a specimen about the middle of July, 1894, in the playground of Bedford County School. Dr. F. D. Drewitt records the capture of a specimen this year, which he says "settled at my feet on the golf links near Felixstowe. As if to increase the effect of this startling apparition, the wings remained for a moment partly expanded. They were then closely folded together along a stem of coarse grass, and so became almost invisible. Both in its method of flight and of folding up its wings on a grass-stem it resembled one of the Crambidæ" ('Field').—F. W. F.

Chœrocampa celerio in Scotland.—Mr. D. Davidson, Dingwall, Ross-shire, records the capture of a fine specimen ('Field,' Sept. 28th).

Colias edusa in Britain in 1895.—

Berkshire.—One specimen was seen in the garden here on June 4th; but I only noticed three in the neighbourhood during August, two being on the 16th and one on the 17th.—J. H. D. Beales; West Woodhay, Newbury.

Devonshire.—One at Bartham, S. Devon, on Sept. 26th; and one at the same place on the 27th.—F. W. Frohawk.

Essex.—I saw several *C. edusa* on Aug. 17th, at Tilbury, flying in company with *Parage megæra*. I was fortunate enough to capture four specimens, all males; they were very fresh on the wing, and in beautiful condition. I also captured several perfect specimens of *P. megæra*. I should like to know whether any one else has seen or captured *Colias* at Tilbury before, as an old friend of mine (an experiened collector), has been there year after year in the month of August, and has never seen a single specimen. On the following Saturday, the 24th, another friend paid a visit to Tilbury, hoping to take *C. edusa* and *P. megæra*, but was not rewarded with even a sight of either. Can any one explain this occurrence?—G. R. Garland; 94, Sedgwick Road, Leyton, Essex, Oct. 18th, 1895.

Hertfordshire.—On Aug. 14th I took a fine specimen a mile or two east of Radlett station in Hertfordshire.—A. R. Heath; Willesden, Middlesex.

Kent.—I caught a fresh specimen at Folkestone on Sept. 7th, and a worn male on the 16th. These were all I saw there during my stay of eighteen days.—Chas. Oldham; Woodford, Oct. 10th, 1895. On Sept. 28th I took two male specimens, one in splendid condition, near here, Some half a dozen specimens have been netted here this season, but I fail to hear of *C. hyale* being seen.—H. Wood; Old Grammar School House, Catford, Kent.

Norfolk.— During a ten-day stay in the fen district, in August, I observed *C. edusa* on the wing. On the 14th I saw one at South Walsham, and another on the 15th at the same place. I also saw two at Ranworth, an adjacent village, on the 19th. *G. rhamni* was abundant, and I saw and captured *P. machaon* in the lanes.—R. Laddiman; 25, Lower Hellesdon Road, Norwich.

Surrey.—On Aug. 18th Mr. W. G. Sheldon and myself paid a visit to Box Hill. *C. edusa* were noted and taken: some half a dozen specimens only, nearly all males; condition fair only. Imagines of *Hesperia comma* were plentiful, but worn.—Thos. Wm. Hall; Sept. 12th, 1895. I have lately seen two specimens, male and female, of this species which were taken close to the town, by a young collector living in the neighbourhood, at the end of August last. I believe that two others were seen on the same day, but not captured. — W. Grover; Kent Villa, Harvey Road, Guildford, Oct. 8th, 1895. To the list of records of *C. edusa* in the 'Entomologist' for September, I have to add several specimens from Surrey. Although by no means so abundant as in 1892, this species has this year occurred much more commonly than usual. The two first specimens of the season were seen on a railway-bank near here, by Mr. S. G. Vaughan, in June. On Aug. 19th and 22nd I took two, both males, near Croydon, and in the beginning of September several specimens were taken near here by friends. The last specimen of the season, a fine male, I saw on Sept. 23rd, flying swiftly along a busy Norwood street.—T. B. Fletcher; Oct. 20th.

Sussex.—I took several specimens of this butterfly in clover-fields near Brighton during August, but they were all somewhat faded. During the last three weeks, however, I have been surprised to find it in large numbers in almost every locality I visited between Brighton and Worthing. I think that there can be but little doubt that there has been an extra emergence, probably owing to the great heat of September; for every specimen, without exception, that I have met with this month has been in exquisite condition. I am informed that numerous specimens have been seen at Rottingdean, to the east of Brighton. Some young friends of mine who were at Niton, in the Isle of Wight, at the beginning of August, found this butterfly in great plenty, as well as the var. *helice*. I may add that I noticed a very fair female at the end of May last, while spending a day at Box Hill, in Surrey.—W. H. Blaber; 34, Cromwell Road, Hove, Sussex, Oct. 21st.

Acherontia atropos in Devonshire.—I am pleased to be able to record that I captured a fine specimen of this Sphinx on Oct. 3rd. It came to light about 8.30 p.m. during rainfall, and was in perfect condition. The light was facing S.W., which is generally an unproductive prospect.—B. S. Chope; Colyford, Devon.

Acherontia atropos in Shropshire.—Two more full-grown larvæ of this species have been brought to me, the last on Sept. 7th; this went down on the 9th, and pupated successfully. On Oct. 12th another larva was received, but as it had been in a dry box for some days the treatment was fatal to it. This makes the eleventh example I have had, and I have heard of two others this year. Five of the pupæ produced moths. In one pupa the right antenna was deformed; the moth from this was minus the right antenna, and the eye on that side was ill-developed. The dates of emergence were Sept. 29th and 30th; Oct. 15th (two specimens) and 18th.—F. C. Woodforde; Market Drayton, Salop, Oct. 20th, 1895.

Acherontia atropos in Somerset.—On Aug. 13th two full-fed larvæ of *A. atropos* were sent me from Wellington, Somerset, by a brother of mine there. One of them I had preserved; the other pupated two days afterwards. The moth, measuring nearly five inches, appeared on Sept. 25th. The pupa was broken on the part of the left fore wing (evidently caused in its larval state), which I feared would entirely disfigure it; but the only damage done was a hole about the size of a small pencil near the posterior margin. Five were found there altogether, feeding on potatoes in gardens. It is many years since they were seen there before.—F. Milton; 184, Stamford Hill, N.

Acherontia atropos in Surrey.—I had a nice imago of *A. atropos* brought to me this morning, captured alive in an old stable-roof in East Croydon by a local bricklayer. The specimen would have been in perfect condition had not the extreme tip of one wing been slightly rubbed. Its stridulating qualities were much in evidence, and caused no small amount of alarm to its captor. Judging from its condition and autumnal emergence, there can I, think, be no question of its having been bred in the district, as all around South Croydon is a considerable expanse of potato-fields, and doubtless the species would turn up in some numbers if properly worked for in the larval stage.—T. W. Hall; 60 & 61, West Smithfield, E.C., Sept. 21st, 1895. A specimen of *A. atropos* in good condition, 125 mm. in expanse of wing, was taken by me in the evening of Sept. 17th ult., flying at an electric light in Kingston-on-Thames.—W. H. Wollstein; Dorset Villa, Kingston-on-Thames, Sept. 24th, 1895.

Acherontia atropos in the London District.—It may interest some of your readers to know that *A. atropos* has occurred this year in the environs of the metropolis. I have just received a fine healthy pupa of that insect from the proprietor of potato-grounds at Lower Tooting, S.W.; his brother turned it up whilst lately digging the potatoes up. A friend of mine has also had one sent him from the neighbouring parish of Merton, S.W.; this was found in the private garden of a relative living there, and emerged on Oct. 1st.—Ed. G. J. Sparke; Tooting Bec Road, S.W., Oct. 22nd.

Acherontia atropos at St. Agnes, Scilly Islands.— Last month I received a very fine female *A. atropos*, partially alive, from Mr. G. W. Brown, who captured the specimen at rest on the entrance gate leading to the lighthouse, on Sept. 14th; it had evidently been attracted by the light.—F. W. Frohawk; Oct. 1895.

Plusia moneta in Essex.—In Mr. Rickard's most interesting "Observations on *Plusia moneta*" (*ante*, pp. 261, 262), he says, "There does not appear to be any recorded from Essex," &c. I captured a specimen in my garden at Woodford June 2nd, 1893, and exhibited it at a meeting of the

South London Entomological Society on July 13th. A report will be found Entom. xxvi. p. 254.—CHAS. OLDHAM; Woodford, Oct. 10th, 1895.

PLUSIA MONETA IN MIDDLESEX.—I should like to record the capture of *P. moneta* here by myself on July 23rd, 1894, a fine specimen having on that day come into the house to one of the lights.—FRANCIS C. WOODBRIDGE; "Old Bank" House, Uxbridge, Sept. 27th, 1895.

PLUSIA MONETA IN SURREY.—On July 2nd last I took with the net in my garden a specimen of *P. moneta*, and on the following evening I captured one more. This may be interesting, as I do not think the insect has been recorded from so near London.—JOHN BERNEY; The Close, Chatsworth Road, Croydon, Sept. 26th, 1895.

SPHINX CONVOLVULI IN 1895.—The following additional records have appeared in the 'Field':—"Nine or ten were killed by a cat last week" (H. F. O. Kearny, Lochiar, Cork, Oct. 18th). "Since writing to the 'Field' we have increased our captures of this moth to eighteen" (J. F. G., Benacre Hall, Wrentham). "Two dozen last week in August and first fortnight of September, on the Holderness coast" (H. Bendelack Hewetson). —F. W. F.

SPHINX CONVOLVULI IN DEVONSHIRE.—On Sept. 7th last I found a specimen of *S. convolvuli* on the beach of Braunton Burrows, N. Devon.—CHAS. BARTLETT; 62, Woodstock Road, Redland, Bristol.

SPHINX CONVOLVULI IN HERTFORDSHIRE.—On Sept. 26th I had a much-damaged specimen of this moth brought me, which had been captured outside a window here, it having been attracted by a bright light.—S. H. SPENCER; Watford, Herts.

SPHINX CONVOLVULI IN CORNWALL.—On Sept. 2nd I had a freshly-emerged specimen of *Sphinx convolvuli* brought to my home. It had been seen crawling up a garden-fence here, and was put into a small tin box that it might be brought to me. When I opened the box, on my return home, I found that it had managed to effectually spoil itself as a cabinet specimen, owing to the confined space. On Oct. 7th a lad saw another specimen climbing a telegraph-pole, and with the aid of his cap caught it, and brought it to me. One of its fore wings was slit lengthwise, and I deemed it best—as it was capable of flight—to give it liberty. Two of the bindweeds, *Convolvulus arvensis* and *C. soldanella*, are abundant all around.—EDWARD STEP; Portocatho R.S.O., Cornwall, Oct. 21st, 1895.

LARVÆ OF SPHINX CONVOLVULI IN CORNWALL.—From a non-entomological friend at Devonport I received a communication last Saturday morning saying he had, the previous evening, sent off by parcel-post a box containing four large caterpillars, which had been brought to him by a fisherman of Port Wrinkle, Whitsand Bay, Cornwall, a small fishing hamlet a few miles from Looe; they were found feeding on "ground ivy." Hoping they were a good sort, my friend had "rewarded the man, and ordered a further supply if obtainable." Of course I expected *rubi* or something of that sort, but was agreeably surprised: the "ground ivy" in the box was *Convolvulus arvensis*, and the larvæ those of *Sphinx convolvuli*. One, full-fed, went to earth the same afternoon, and was of a pale green colour; another, nearly full-fed, is a dirty white; the other two, one about half grown, the other three-parts, are of the brown type figured in Barrett's book; these three are feeding freely on the larger convolvulus. While fishing last summer with the finder, I, having in mind *Acherontia atropos*, asked him if he remembered finding any large green caterpillars on the potatoes, and when digging his patch to look out. I have been taking a fair number of *Xanthia gilvago* at sugar in my garden here this season.—W. T. Sturt; West House, Queen's Road, Kingston Hill, Oct. 21st, 1895.

Sphinx convolvuli in Dorset.—A member of my family and myself captured, between Aug. 12th last, and the 7th inst., fifty-one specimens of *S. convolvuli*. Four-fifths of these were taken on a border in my flower-garden, measuring about 20 yds. by 1½ yds., in which petunias and tobacco plants were growing; the remainder in a garden close by. The earliest taken were hovering over the petunias, but subsequently the tobacco plants were most attractive. The largest specimen measures five inches from tip to tip of wings, and the largest number caught in one evening was seven. —Jno. P. Hyde; The Grove, Portland, Dorset, Oct. 22nd, 1895.

Notes on Arctia caia.—During the summer I have been breeding *A. caia* in hopes of obtaining a variety. On Sept. 22nd a few larvæ spun up, although others were quite small. The remaining larvæ now scarcely touch their food, and are evidently preparing to hybernate. On Oct. 4th, to my great surprise, a small male emerged in my breeding cage, and on the 7th another male made its appearance. Considering the fact that most of the larvæ have not even pupated, is not this a rather unusual occurrence?—Geo. Stanley Morley; Oakdene, Epsom.

[It is pretty generally known that those who rear *A. caia* often obtain an autumnal emergence of this species, and it is said that variation more frequently occurs among these autumn specimens than is the case among those which emerge at the normal time.—Ed.]

Notes on Hemiptera-Heteroptera.—On June 15th, 1893, whilst sweeping among low-growing herbage at Headley Lane, I took an insect, which I have only lately discovered to be a fully developed specimen of *Mecomma ambulans* (female). This year, at Offley, near Hitchin, on Aug. 17th, I took a fully developed specimen of *Myrmus miriformis;* about nine miles further south, close to Codicot, on Sept. 6th, a specimen of *Berytus crassipes*, together with four specimens of *Neottiglossa inflexa*.—R. M. Leake; 15, Alleyn Park, S.E.

Notes on the Lepidoptera of Salisbury.—Though 1895 appears to have been a bad year for Lepidoptera, we have done fairly well with the Rhopalocera. Heterocera have, as a rule, been scarce. The following are our best captures this season:—At the end of May we took three specimens of *Thecla rubi*, one of *Macroglossa stellatarum*, and one of *M. bombyliformis* in some woods five miles from here. *Argynnis euphrosyne* swarmed in the same place. I have not seen *A. selene* this year. During July I found *A. adippe* very abundant in the neighbouring woods; *A. paphia* was much less common, and *A. aglaia* very rare. I found *Lasiocampa quercifolia* on a brick wall not far from our house. My brother took a specimen of *Vanessa urticæ* lacking the two small spots on the fore wings, and corresponding to the description of the foreign variety *ichnusa*. My sister has also taken *Sphinx pinastri*, and a specimen of *P. brassicæ* having one fore wing bearing the female markings and the other three of the male type. The body resembles that of a male. Among the best Noctuæ taken this season are *Gonoptera libatrix* (Sept. 13th), *Plusia chrysitis* (abundant), and *Polia flavicincta*.—C. M. Gummer; 2, Swayne's Close, Salisbury, Sept. 14th, 1895.

Lepidoptera at Chichester and Neighbourhood.—My collecting did not begin much before the end of May; my first captures being *Hemerophila abruptaria*, *Coremia ferrugata*, and the first brood of *Cilix glaucata* (*spinula*), *Eupithecia exiguata* and *Phibalapteryx vitalbata*. *Melanippe rivata* proved most tiresome from their abundance. *Anticlea rubidata* appeared in my breeding-cage on June 7th, and was met with first on the wing on June 14th—fully a month earlier than usual. When bred in large numbers it will be seen that the insect varies considerably, some specimens having a bronze or brassy tint, some are pale, almost whitish, and whilst the ruddy colour in some is very bright, in others it almost approaches a brown hue. During this month my captures were *Lomaspilis marginata*, *Asthena luteata*, *Melanippe procellata*, *Plusia chrysitis*, *Leucania pallens*, *L comma*, and *Amphidasys betularia*. *Timandra amataria* and *Acidalia imitaria* were both common. The first *Uropteryx sambucata* I saw was on July 3rd. The next day I had the good fortune to capture a fine *Aventia flexula* at Singleton, about six miles distant. *Melanthia bicolorata* (*rubiginata*) appeared early in the month, and in the same lane, where *Inula dysenterica* grows abundantly, *Ebulea crocealis* was common, also *Hemithea thymiaria*. On the 18th of this month I took at Singleton a good variety of *Acidalia aversata*, *Cosmia trapezina*, *Lycæna astrarche* (*agestis*), *Strenia clathrata*, *Lithosia complana*, and *Eubolia bipunctata*. The next day I found *Leucoma salicis* on a wall surrounding some poplars, where at times I meet with the larvæ and pupæ in some numbers. On the 29th *Triphæna interjecta* was captured, and at light *Eupithecia coronata*, *Pyralis glaucinalis*, and *Paraponyx stratiotalis*, *Agrotis puta*, *Cilix glaucata*, and *Pyralis fimbrialis*. On Aug. 1st, *Leucania impura*, and on 16th *Eupithecia centaureata* and *Cilix glaucata* came to light, and larvæ of *Acronycta aceris* were found on sycamore. During this month my visitors to sugar comprised *Amphipyra pyramidea*, *Agrotis puta*, *A. saucia*, *Noctua plecta*, *Apamea didyma* (*oculea*) (very variable, several quite black, var. *leucostigma*), *Cosmia diffinis*, *C. affinis*, *C. trapezina*, *Mania maura*, *Catocala nupta* (abundant). Amongst the *C. nupta* was one with very light lurid wings inclining to yellow; on the right wing particularly, and another with the hind wings a light pink—a very pretty colour. On the 16th a fine *Eugonia fuscantaria* was taken at light, and during the month *Hesperia comma* was met with at Kingly Vale. On Sept. 3rd a *Timandra amataria*, a female, apparently just out from the pupa, was captured at sugar, and several specimens of *Xanthia gilvago*, with the much commoner *X. fulvago* (*cerago*). Two specimens of *Sphinx convolvuli*, in poor condition, and an imago of *Acherontia atropos* were taken in the last week of the month. On Oct. 1st *Xylina semibrunnea*, *Scopelosoma satellitia*, *Orthosia lota*, and *O. macilenta* came to sugar. The miserably cold, wet, and tempestuous weather has quite put a stop to sugaring operations for the present at least.—Joseph Adderson, Jun.

Insects at Light during 1895.—Again I am pleased to be able to set forth, perhaps for the last time since the incandescent gas has just come into vogue throughout Ipswich, the respective merits and demerits of electric light, as compared with those of gas-lamps, as an attraction to insects. I will not again give a full list of Macro-Lepidoptera, as I have in previous years monopolised much valuable space, but merely mention those species not before recorded.

The following have been added to the electric light list:—*Smerinthus ocellatus* (only previously seen), *Chærocampa elpenor*, *Zeuzera pyrina*, *Cossus ligniperda* (female), *Nudaria senex*, *Leucoma salicis*, *Dasychira fascelina* (seen), *Lasiocampa quercifolia* (several), *Angerona prunaria*, *Phigalia pedaria*, *Boarmia repandata*, *Cabera pusaria*, *Aspilates ochrearia*, *Abraxas sylvata*, *Hybernia rupicapraria*, *Eupithecia nanata*, *Melanippe sociata*, *Phibalapteryx vittata*, *Pterostoma palpina*, *Notodonta dictæoides* (several), *N. dromedarius*, *Miana fasciuncula*, *Triphæna pronuba*, *Noctua triangulum*, *N. baia*, *Cosmia trapezina*, *C. pyralina*, *Dianthœcia cucubali*, *Aplecta advèna*, *Rivula sericealis*, *Pyralis costalis*, *P. farinalis*, and *P. glaucinalis*, *Paraponyx stratiotalis* (common), *Hydrocampa stagnalis*, *Botys verticalis* and *B. urticalis*, *Pionea forficalis*, *Spilodes cinctalis*, *Scoparia dubitalis* and *S. mercurella*, *Crambus pinetellus*, *C. perlellus*, *C. tristellus*, *C. inquinatellus*, *C. geniculellus*, *C. culmellus* and *C. hortuellus*, *Ephestia elutella* and *E. kuhniella* (previously only recorded from N.W. Suffolk), *Phycis carbonariella* and *P. roborella*, *Tortrix podana*, *T. heparana* and *T. costana*, *Peronea variegana*, *Carpocapsa pomonana*, *Dicrorampha ? plumbagnana*, *Tinea fuscipunctella*, *Hyponomeuta cagnagellus*, *Œcophora pseudospretella*, *Endrosis fenestrella*, *Cemiostoma laburnella*, *Agdistes bennetii* (new to the Suffolk list), *Pterophorus bertrami*, *P. pentadactylus* and *P. pterodactylus*, *Alucita hexadactyla*. Coleoptera:—*Nebria brevicollis*, *Pterostichus madidus*, *Amara apriciaria* (simply swarming one evening), *Harpalus ruficornis* (common), *Agabus bipustulatus* (common), *Illybius fuliginosus* (common), *Creophilus maxillosus*, *Bledius taurus* (two fine females), *Aphodius rufipes*, *Serica brunnea*, *Melolontha vulgaris*, *Agriotes obscurus*, and *Telephorus fuscicornis*. Neuroptera:—*Hemerobius humuli*, *H. limbatus* and *H. subnebulosus*, *Sialis lutaria*, *Chrysopa vulgaris* and *C. septempunctata*, *Colpotaulius incisus*, *Limnophilus rhombicus*, *L. lunatus*, and *L. politus*, *Halesus radiatus*, *Triænodes conspersa* (new var.), and *Mesophylax aspersus* (new to Britain). The other orders come far less freely. Diptera:—*Tipula oleracea* and *T. varipennis*, *Culex annulatus*, *Lucilia sericata*, *Calliphora erythrocephala*, and *Stomoxys calcitrans*, with, of course, hosts of *Chironomi*. Heteroptera:—A single *Astorhinus angulatus*, and a couple of *Corixa striata*. Hymenoptera:—Many *Ophion obscurus* and *O. luteus*, with *Paniscus virgatus*, *P. testaceus*, and *P. inquinatus*, and a single *Athalia rosæ*.

At lamps of various kinds several Macro-Lepidoptera have been added, but the Micros fall considerably short of the preceding list:—*Arctia villica* (at a shop window), *Ennomos fuscantaria*, *Acidalia promutata*, *Emmelesia alchemillata*, *Lobophora polycommata* (new to the Suffolk list), *Thera variata*, *Leucania conigera*, *L. comma*, *Luperina cespitis* (not uncommon in one locality), *Agrotis aquilina*, *Noctua umbrosa*, *Triphæna pronuba*, *Anchocelis lunosa* (not uncommon), *Xanthia gilvago* (not seen since 1893, very common), *Tethea subtusa* (seen), *Polia flavicincta*, *Hadena dentina*, *Habrostola urticæ*, *Herminia tarsipennalis*, *Pyrausta purpuralis*, *Scopula ferrugalis*, *Stenopteryx noctuella*, *Tortrix podana*, and *T. heparana*, *Peronea variegana*, *Dictyopteryx contaminana*, *Diurnea fagella*, *Endrosis fenestrella*, and *Tineola biselliella*.

By the foregoing list it will be seen how much greater is the attraction of electric light than that of the ordinary gas-lamp. I hope next year to have experimented upon the new incandescent light, and expect the tables to be completely turned, as it is doubtful whether a moth would reach the centre of the town, having, as will be the case, a cordon of very bright albeit small lights to pass *en route*.—Claude Morley; Ipswich, Oct., 1895.

OBITUARY.

Major John A. Still died suddenly while playing at golf on Whitchurch Down, near Tavistock, Devon, on the 23rd September last, at the early age of 47. He was the eldest son of Captain John T. Still, of Castlehill, Axminster, and of Mountfield, Musbury. Major J. A. Still entered the Army as Ensign in the 25th Regt. K. O. B.'s in June, 1867, he resigned when purchase was abolished in 1873. He joined the 3rd Batt. Royal Wiltshire Regiment in 1875, and retired with the rank of Major in 1886. After his retirement he recommenced collecting Lepidoptera, with a view of completing his collection begun while at college before entering the Army, devoting his whole time to that object during the summer, thereby obtaining numerous duplicates, which he distributed with a free hand. He will be missed very much by his numerous entomological correspondents, and by his personal friends so suddenly deprived of his very congenial companionship.—G. C. Bignell.

[In a recent letter referring to the late Major Still, Mr. Hodges says:—"I had the pleasure of a week's collecting with him in 1894, and about ten days this year, at his own invitation, in pursuit of *L. arion*, and should like to mention his sportsmanlike and courteous behaviour to myself, an almost complete stranger to him. He had a great horror of modern exterminators, and did his best to keep his locality private from such. His last act on leaving the spot this season was to release six living female *L. arion* which he had previously boxed, so as to ensure leaving some to perpetuate the species."—Ed.]

By the death of **William Henry Tugwell**, which we briefly recorded in our last number, we lose another of the links connecting the past generation of entomologists with the present, a loss that will be felt by a very large number of friends and correspondents scattered throughout the length and breadth of the kingdom; but most of all, perhaps, by those whose privilege it was to have his personal acquaintance. Born in the quiet town of Reigate, in 1831, he early acquired a taste for the wonders of Nature by which he was surrounded, the chalk downs on the one hand and the well-wooded country of the Tilgate Forest at no great distance on the other, affording opportunities for the exercise of his powers of keen perception, of which he did not fail to take advantage. But his lot was not to continue in such pleasant places, and, having selected as a profession that of a pharmaceutical chemist, he removed to London, and for some years resided in the heart of the City. Even under these circumstances his love of Nature was not allowed to languish. No opportunity of visiting the scenes of his youth was lost, and nothing gave him greater pleasure than on a hard-earned holiday to ramble through Tilgate Forest and Wykehurst Park with the late Tester, under whose guidance he had learned every inch of the ground, in quest of some of the "good things" that were in those days to be found in the district—*Endromis versicolor*, now a thing of the past, among the number. After some years spent in London he removed to Greenwich, where he established a prosperous business; but this necessitated close personal attention, and, with the exception of his regular morning "constitutional," taken before business hours, he had little opportunity for collecting. It was, however, surprising to find the number of species, many of them by no means common ones, that his keen eye detected on the palings and tree-trunks in the immediate neighbourhood of his residence during these short rambles. He also gave much attention to rearing larvæ, and was thus enabled to furnish the life-histories, previously unknown, of many of our rarer species, as well as to enrich his collection with unusually fine series of them. But an opportunity for more extended field work was afforded by the annual holiday; it was on these occasions that his most notable captures were made. He was among the first to detect *Zygæna meliloti* in the New Forest; *Nola centonalis* at Freshwater, and later at Deal; and from the material obtained at the latter locality, to work out the life-history of this species, as well as that of *Acidalia ochrata*. In the same neighbourhood he was fortunate in taking the rare Pyrales, *Mecyna polygonalis* and *Margarodes unionalis;* while from moths taken at Abbot's Wood he added the life-history of *Agrotera nemoralis* to our knowledge. In 1886 he set his heart upon taking *Zygæna exulans*, and having with some difficulty obtained the necessary permission to work the domain in which its highland home was known to be situated, he started north with his intimate friend Lachlan Gibb, and, after some days spent in wandering over mountains, they were rewarded by securing a goodly number of specimens, much to his delight, but not without considerable strain upon his physical power. Although a man of somewhat pronounced opinions, he was an exceedingly pleasant acquaintance, and a true friend to those who enjoyed his confidence, and in the field a most pleasant companion, his intimate knowledge of botany and ornithology adding not a little to the interest and enjoyment of rambles taken in his society. His contributions to entomological literature were frequent, and consisted for the most part of notes of general interest, commencing with the first volume of the 'Intelligencer,' and appearing from time to time in the various journals devoted to the subject, his last appearing posthumously in our October number. He joined the South London Society in 1873, and occupied the presidential chair in 1891, taking an anxious interest in its affairs throughout his membership. Some three years ago he was seized with the distressing spinal disorder which ultimately proved fatal; but although deprived of his powers of locomotion, and in almost continuous bodily suffering, he continued not only to supervise his business, but to follow out his entomological work, so far as the altered circumstances would permit, the rearing of sundry species from the egg occupying a considerable portion of his attention. We learn that his fine, and in some respects unique, collection will shortly be offered for sale. He died on Sept. 20th, regretted by all who knew him, most by those who knew him best.—R. A.

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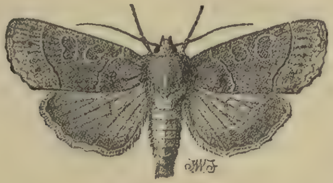
MESOGONA ACETOSELLÆ, Fab.



The above figure represents a specimen of *Mesogona acetosellæ* taken at "sugar" by Mr. Thomas Salvage on the evening of Saturday, 26th October last, in his garden at Arlington, Sussex, and, so far as I am aware, it is the first recorded occurrence of the species in Britain.

In the earlier part of the present month I had an opportunity of inspecting Mr. Salvage's captures of the present season, and on looking through one of his boxes I detected an insect that I could not identify with any of our British species, and which he told me he had recently taken—in fact, had only removed it from the setting-board that morning. He described its appearance at the time of capture as resembling a strongly-marked *Tæniocampa stabilis*, but could not understand that species being on the wing in the autumn. At my request he very kindly granted me the loan of the specimen until the following day, and on my way home, happening to meet my friend Mr. C. G. Barrett, I showed it to him, and he at once recognized it as *M. acetosellæ*. The specimen is a female, and, with the exception of worn fringe, is in fairly good condition, but from the appearance of the abdomen had evidently parted with her ova before capture.

On the European continent the species has a wide geographical range, extending from Central Russia, through Germany and Switzerland to France, but is said to be somewhat local. The larva feeds chiefly on oak, but is reported also to eat beech and blackthorn, as well as low plants. It is full-fed in May and June, when it pupates in an earthen cocoon, and the imago emerges in autumn. Continental authors place *Mesogona* immediately following *Pachnobia.*

Robert Adkin.

Lewisham, November, 1895.

Description of the above specimen of M. acetosellæ, F.

Female. Primaries greyish brown, finely dusted with black scales principally along the costal and inner margins; the neuration, which is indistinctly defined, is rufous, adding a general reddish tone to the whole surface; there are two transverse distinct whitish curved lines crossing the wing, widely separated on the costal margin, approximating to one-half on the inner margin, the first at basal fourth, edged outwardly with brown, the second running parallel to the hind margin, internally edged with darker brown; these lines enclose the orbicular and reniform, which are slightly darker than the ground-colour, and are clearly and finely outlined with creamy-white; a submarginal series of blackish triangular spots bordered externally with pale crenulations; hind margin crenulated and dark-spotted; fringe ochreous, edged with dark fuscous. Secondaries paler, and inclining to pinkish, with a darker marginal band, and a very indistinct central transverse pale line inwardly edged with dark; hind margin crenulated and wavy; fringe ochreous and rufous. Head and thorax same colouring as primaries; abdomen ochreous; legs and antennæ rufous-brown, latter whitish at base. Expanse 1¾ in.

F. W. F.

A NEW CLASSIFICATION OF LEPIDOPTERA.*

Amongst the numerous works of a more or less systematic and scientific character which have recently appeared or are appearing on the British Lepidoptera, Mr. Meyrick's 'Handbook' is entitled to a foremost place. It is handy as regards size, not one of the least qualifications for a handbook, moderate in price, complete in regard to containing all our well-authenticated species, convenient to the learner in its tabulations of families, genera, and species.

In order to secure some of these advantages, it is compressed and abbreviated to a degree; repetitions are severely avoided, so that, unless one looks in the right place, an omission of some important character may be wrongly surmised, but, so far as we have tested, no obscurity is caused by these devices, whilst handiness is immensely increased. To those of us whose first definite ideas of Lepidoptera were obtained from Stainton's 'Manual,' and who find it difficult altogether to outgrow our early lessons, the considerable changes in nomenclature are not at all attractive; but we must give as graceful an acquiescence as we can where they are shown to be right, and therefore necessary. To the young student the system of nomenclature will present no greater difficulties than any other would have done. The amount of good, sound, accurate work on the part of the author must have been very great, as he tells us that all structural characters have been verified by his own observations.

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* 'A Handbook of British Lepidoptera.' By Edward Meyrick, B.A., F.Z.S., F.E.S., &c. Macmillan & Co., 1895.

We have little doubt that the book will be the Handbook of the working lepidopterist in the same manner as the 'Manual' has been for a third of a century. It is for this reason that we think it desirable to consider whether the classification adopted, and now "fully published for the first time," is sufficiently sound and correct to be adopted, for perhaps another third of a century, without any reservation.

We find that the classification is based almost entirely on the neuration; other characters are mentioned in the descriptions, but are usually severely neglected as grounds of classification. It is undoubtedly true, as advanced by Comstock, that any one character may be made use of for classification, and must give correct results if correctly observed and fully understood; but it is precisely here that the study of a solitary character fails; similar modifications occur along parallel lines that are nevertheless widely divergent phylogenetically; very slight modifications will occur over a large area in some families: great modifications within the limits of a genus within others, and so on. These difficulties can only be overcome by frequently considering many other characters, and using them to enable us to interpret the meaning of the one we have selected. The result is that a classification based on one structural point gives us, to take a botanical parallel, a Linnean and not a natural system, and has a mechanical rather than a scientific character. In the work before us there is evidence that this is the case, although the cases in which a true result is reached are of course very numerous.

It is a pitfall for the neurationist that the characters he adopts, especially when he limits them as our author does, lend themselves to easy observation and simple numerical tabulation. The limitation our author makes is a very curious one, and throws over so weighty (phylogenetically) a feature of neuration as to surprise one very much.

This very important feature in the neuration of the Lepidoptera, which is several times referred to, but, so far as we can see only to be dropped as of no importance, is the gradual formation of the cell; the cell cannot be said to exist in the Palæo-lepidoptera (Packard), but is a most definite feature in the higher Neo-lepidoptera (Packard). Had our author paid due attention to this, we think he would have agreed with Packard, Dyar, and others in the position to be assigned to several of the lower families, and would never have given us so unnatural a group as his Psychina. By the way, we may say that the book not being one to be read straight through, we may have missed something, but, so far as we have noticed, our author absolutely ignores Dyar's work on the larval tubercles. In *Hepialus* the formation of the cell has already made definite progress, and so, treated from a neuratimal standpoint alone, it is possible to place *Hepialus* in the Neo-lepidoptera and separate it from the Micropterygides. Amongst British forms we find the next stage in *Zeuzera*, and our author, with his large acquaintance with exotic forms, is no doubt able to supply some of the intermediate positions; and we pass on without any great hiatus to *Cossus*. In several higher groups, and especially in many Tortrices, certain records of the later stages of the process remain. A similar evolution may be traced in the Tineid Stirps. Our author, however, ignores all this, and pays no attention whatever to the neuration, except that outside the cell.

Supposing the maxillary palpus had been taken as the structure on which to base a classification, we might then have started with the Palæo-lepidoptera, progressed through certain Tineina, reached the Pyrales, and then might have placed the Hepiali above these. This illustrates the absurdity of treating a single character in a mechanical or Linnean manner, and serves to show the importance of handling your one structural character in a proper way. It serves also to show, as might be shown from half a dozen other characters, that *Hepialus* belongs to the Neo- and not the Palæo-lepidoptera, and that a wide gap exists between *Hepialus* and *Micropteryx*, a gap vertically as well as laterally. Different forms of the lowest Neo-lepidoptera have retained, in different degrees, different characters of the Palæo-lepidoptera. *Hepialus* happens to have retained especially certain wing characters, but they have diverged as regards maxillary palpi and some other imaginal characters, such as ocelli and tibial spurs, both characters which are up to this point in a very unfixed state; they have also largely diverged as regards larval and pupal characters. A larva with well-developed prolegs, and a pupa with so many parts well fixed, cannot belong to the Palæo-lepidoptera. It would be quite as correct to place Heterogeneidæ in the Micropterygides (Palæo-lepidoptera) because all (1—7) the abdominal segments of the pupa are free, as to place *Hepialus* there because it retains the jugum and additional veins to the hind wing.

There seems to be a great probability that the Psychidæ and the Heterogeneidæ (Is this final, and are we to drop Limacodidæ, Apodidæ, Cochliopodidæ, and sundry other names with which this family has been so lavishly endowed ?) have separate origins from lost families of the Palæo-lepidoptera, and that from *Micropteryx* the Adelids, Tineæ, and those forms that largely preserve the maxillary palpi arose, whilst a separate branch took origin probably from a lost family of the Palæo-lepidoptera, and early lost the maxillary palpi, keeping them for some time in the pupa. This is the Hepialid, Zeuzera, and Tortrix Stirps. A more complete discussion of the neuration, especially with reference to the evolution of the cell from the system of nearly parallel or rather radiating veins of the Palæo-lepidoptera, will probably lead to conclusions very similar to these, which are reached on other grounds.

The group of the Psychidæ (including Talæporia, &c.), which no one who has examined the larvæ and pupæ, and the various stages of the degradation of the female to complete limblessness can doubt to be a thoroughly natural one, possibly divisible into subfamilies, but still fairly homogeneous, is treated in a remarkable way. Psychidæ is reduced to two species, and forms the leading family of the Psychina; the remaining species are placed beside Talæporia, which is left in its old place beside the Tineæ. The one group is stated, however, to be derived from the other, so that there is an appearance of hunting with the hounds and running with the hare.

Our author also states *Ocneria* to be derived from *Psyche*. Eggs, larvæ, and pupæ, and in most characters the imagines, so thoroughly contradict this, that we had always attributed this statement, when we had previously met with it, to the extraordinary likeness there is between *Orgyia* (say *antiqua*), (some exotic species have even more maggot-like females, &c.) and *Psyche* (say *unicolor* or *villosella*) in the imago state, in both sexes, due to no community of origin, or identity of structure, but to adaptation to almost identical habits.

We must refer to the impossible position given to *Nola* and *Earias*, whose ova are sufficient to divide them abundantly from the Arctiidæ, even if the larvæ and pupæ did not so strongly differentiate them. We agree with his statement that "they are sufficiently isolated to make their origin at present undecipherable:" why did he not act on this ? The grouping of species in genera is often very contrary to our prepossessions, often apparently quite justly, however; but others are very difficult to accept, such as *exoleta* and *viminalis* in the same genus (*Polia*) with *chi* and *aprilina*. Any one who has reared any of the Heliothidæ will refuse to accept *umbra* as a *Caradrina*, along with *trapezina, petasites, hellmanni, morpheus, exulis*, &c., with *Nonagria* and half a dozen other genera between it and *Heliothis*.

If space permitted, we might quote many similar cases; we will only, however, refer to *Lampronia capitella*, which is placed (with *oehlmanniella*) at the commencement of *Tinea*, with *arcuatella*, *cloacella*, *pellonella*, and other true Tineæ, and separated from *Lampronia* by half a dozen genera of the *bisselliella*, *tapetzella*, and *ochraceella* groups. There is no more natural generic group than the Lampronias, of which we are acquainted with the early stages of *quadripunctella*, and have bred *rubiella* and *capitella* from the egg. The generic characters given for *Lampronia* and *Tinea* are absolutely identical, but we fancy there is a misprint, as *Tinea* is said to have seven to costa in the diagnosis, but in the table it is given seven to termen. If this is the character which separates them, then we can only say, that the results it leads to prove, not that *capitella* is a *Tinea*, but that the character that would make it one is actually, and probably essentially, a wholly untrustworthy one.

We are not so sure about anything as our author appears to be about everything, and there are limits to our space, or we should state our reasons for disagreeing with the position, amongst others, of Arctiids; still more of *Pterophorus* and *Sesia*. We say "appears," because no doubt much of the dogmatic cocksureness, that ruffles one a little sometimes, is due to the definiteness and brevity that we have found so highly to be praised from several practical points of view.

There are several things that are contrary to tradition that are undoubtedly sound, such as placing *Brephos* and *Thyatira* with the Geometræ, *Cossus* and *Exapate* in the Tortricina &c.

Excellent as the book is, and most useful as we expect it to be, the predominance of a Linnean character in the arrangement is what most impresses us. No doubt this will be most useful to our younger students, as a stimulus to them to labour to set it right.

T. A. C.

ON THE VERTICAL DISTRIBUTION OF THE RHOPALOCERA IN THE ALPS.

By W. Harcourt-Bath.

Contrary to that which is the case in this country, in the Alps Rhopalocera permanently reside at all altitudes upon the mountains as far as the upper limits of phanerogamic vegetation. The causes of this are not far to seek. In the former area the elevations which are of any considerable altitude are isolated and detached, and only contain a small extent of surfaces belonging to the upper zones; moreover, the vegetation is comparatively poor in species. The climatal conditions also which prevail are very unfavourable to Rhopalocera, consisting of excessive precipitation and insufficient sunshine, though, even if this were reversed, the non-presence of surrounding higher peaks, which would afford the lesser elevations protection from the wind, would cause the insects to be all blown off their treeless summits in no time. The paucity of species of Rhopalocera in the principal mountainous districts in the British Isles supplies the direct cause for their great scarcity at any considerable elevation; 1000 feet above the sea-level seems to be the highest vertical limit beyond which the majority of species do not ascend in this country.

In the Alps all the circumstances are very different; everything, in fact, is favourable to the existence of Rhopalocera, the absence of their pabula constituting the chief barrier to their upper extension upon the mountains. Several species are accordingly known to exist even above the line of congelation, among the snow, wherever small patches of vegetation can secure a roothold among the rocks. Thus, upon the summit of the Gornergrat, in the Pennine chain, at an elevation of over 10,000 ft., I have encountered one species, namely, *Erebia glacialis*. Several odd specimens of the Vanessidæ have been seen at higher elevations still, but they are only wanderers to those altitudes, and do not undergo their transformations there.

The lower zones in the Alps of course contain the greatest number of species, and the higher one ascends the fewer will they become.

One of the most familiar butterflies in the region in question is the handsome *Papilio podalirius*, which is pretty plentiful in most of the lower valleys, but does not attain to any great elevation among the mountains, about 3800 ft. above the sea-level being the highest altitude at which I have observed it. *P. machaon*, which, however, is more local and generally less common, ascends a few hundred feet higher, often occurring among the pine woods of the lower alpine zone. The beautiful large crimson-ringed *Parnassius apollo* is one of the most conspicuous butterflies of the lower mountain region, and is also, on account of its plentifulness, perhaps the most typical species in the Alps. It occurs between the altitudes of 3000 and 6000 ft. I have found it a little below the first-named figure at Stalden and Aigle in the Rhone Valley, in the upper portion of the vine zone, but in general it is not seen until this has been passed. Its upper limit terminates amidst the forests of conifers. The closely allied *P. delius* is much more local and scarce, and its area of distribution is also considerably more circumscribed. Its lower limit slightly overlaps that of the preceding species, but its upper limit extends beyond the pine woods into the upper alpine region occupied by the rhododendron and charming alpine plants, which give forth such an array of bright-coloured flowers in the summer time, affording abundant pleasure alike to the tourist and the scientific traveller. This species sometimes reaches an altitude of close upon 8000 ft., at which height I have seen it upon the Riffel Alp near Zermatt.

Of the *Pieridæ*, *Aporia cratægi* and *Pieris brassicæ* ascend to 5500 ft. into the pine woods, while *P. rapæ* and *P. napi* with its alpine variety *bryoniæ* may be seen on the wing nearly 1500 ft. higher, stray specimens occurring above the forest region. The beautiful *P. callidice* I have seen in abundance at an elevation of nearly 8000 ft. on the Gemmi Pass and on the Riffel, and a few individuals more than 1000 ft. higher still, among the snow. *Euchloë cardamines* does not ascend beyond the shelter afforded by the woods, but its relative *E. belia* var. *simplonia* occurs above this region to the height of over 7500 ft. *Leucophasia sinapis*, which is very abundant in the Alps, is found to the altitude of 5500 ft. *Colias hyale* and *C. edusa* may be seen everywhere up to the region of the conifers, the former rarely ascending into the upper alpine zone, where, however, its relative *C. phicomone* is exceedingly abundant in certain localities in company with the rich yellow *C. palæno*. I have seen both the latter species at an elevation of about 8000 ft. in the Pennine Alps. *Gonopteryx rhamni* I have observed no higher than 3000 ft. in the Bernese Alps and Jura.

Of the "coppers," *Chrysophanus hippothoe* is the most plentiful, occurring in abundance, especially in the pine woods, within which the lovely *C. virgaureæ* also dwells. The Lycænidæ are very numerous in species, and considerably in evidence everywhere. *Lycæna bellargus*, *L. corydon*, *L. icarus*, *L. damon*, *L. hylas*, *L. escheri*, *L. eros*, *L. ægon*, and *L. astrarche* are all found in the pine woods, but do not, I think, ascend higher. *L. semiargus*, *L. minima*, *L. arion*, *L. orbitulus*, and several others are, however, found above this elevation, while I have only seen *L. argiolus* in the lower valleys.

The "Fritillaries" are exceedingly plentiful in the Alps. *Argynnis adippe*, *A. paphia*, and *A. dia* I have not seen above the height of 4000 ft., but *A. niobe* with its variety *eris*, *A. aglaia*, *A. euphrosyne*, *A. amathusia*, *Melitæa phœbe*, *M. athalia*, and *M. dictynna* are all plentiful in the pine region; *Argynnis pales*, *Melitæa cynthia*, *M. aurinia* var. *merope*, and *M. parthenia* var. *varia* occurring still higher, in the upper alpine zone. *Melitæa didyma* and *Argynnis lathonia* have their head-quarters in the vine district, but stray specimens may occasionally be met with in the region of conifers.

Of the Vanessidæ, *Vanessa io*, *V. antiopa*, *V. c-album*, and *V. polychloros*, according to my experience, are confined to the lower valleys and slopes, but *V. atalanta*, *V. cardui*, and *V. urticæ* range high up upon the mountains, the latter species putting in its appearance almost everywhere.

We now come to the *Satyridæ*. *Melanargia galatea* swarms in most meadows up to the height of 3000 or 4000 ft., in company with several species of the extensive genus *Erebia*, of which *E. blandina* is the most abundant in the lower mountain region; but as soon as we ascend to the pine woods many other species commence to occur, especially of the group closely allied to *E. epiphron*, while others continue to exist up to the line of congelation, among the latter being *E. lappona*, *E. tyndarus*, *E. gorge*, and *E. glacialis*, the abundance of some of them giving the upper alpine zone quite a distinctive character of its own. Of the typical genus *Satyrus* the three most familiar species are perhaps *Satyrus hermione*, *S. semele*, and *S. cordula*, which are all more or less plentiful in certain localities, but do not, I think, ascend beyond the upper limits of the belt of deciduous trees, namely, about 4000 ft. *Pararge mæra* and *P. hiera*, however, occur among the conifers, in company with *P. ægeria* var. *egerides* and *P. megæra*. *Epinephele ianira* and *E. hyperanthes* swarm everywhere up to the elevation of 3000 to 4000 ft.

The little *Cænonympha pamphilus* does not appear to be very abundant in the Alps, although it occurs up to an altitude of about 6000 ft. Its place seems to be occupied by a closely allied species, namely, *C. satyrion*, which occurs in great plenty in the pine woods in certain localities, and even extends its area of distribution to the upper alpine zone. *C. arcania*, of which the preceding is supposed by some authorities to be merely a mountain variety, reigns supreme at lower elevations.

The Hesperiidæ are comparatively numerous in species in the Alps; all the British species of this family, with the solitary exception of *Hesperia actæon*, I have found more or less commonly up to the region of the conifers. A large handsome species, *Spilothyrus lavateræ*, occurs, but only singly, on the lower slopes of the mountains up to about 4000 ft., in company with several species of the genus *Syrichthus* closely allied to our own *S. malvæ*, while *S. alveus* I have seen at an elevation of over 8000 ft. in several parts of the alpine range.

The preceding is by no means a complete list of the Rhopalocera which are found in the Alps, and is only intended to furnish an account of the more familiar forms which occur at the various altitudes, and which may be met with almost every season by every one who cares to undertake a trip into the region in question.

Now, in order to intelligently study the vertical distribution of the Rhopalocera in the Alps, it is necessary to adopt a series of vertical or ascending zones. These supply a much more convenient means of tabulating their occurrence at the various elevations than mere absolute altitude above the sea-level, as the climatic and phanerogamic conditions vary so much in different parts of the range, often on account of purely local circumstances, that figures are frequently very misleading. As the result of my own independent observations, I have been enabled to propose the series of vertical zones given on page 327. They are practically the same, however, as those defined by Messrs. Speyer in their excellent work on the 'Geographical Distribution of the Swiss and German Lepidoptera.' The only differences are, first, the addition of the olive zone, which occurs on the south side of the Alps, namely, in sheltered valleys at the foot of the Maritime, Pennine, and Lepontine chains; and, secondly, the division of Messrs. Speyer's lower region into those of the vine zone and lower hill zone respectively. These two additional zones are necessary on account of the unfair value which is attached to Messrs. Speyer's lower zone; besides, they represent two very important climatal belts,—the olive zone terminating polewards at the annual isotherm of 54·5° F., and the vine that of 50° F. This arrangement harmonises with that given in my article "On the Vertical Distribution of the British Lepidoptera" (Entom. xxvii. pp. 2, 27), to which I beg to refer the reader who desires to know the British equivalents for the vertical zones in the Alps, also their mean annual temperature.

The olive zone is very well defined in the Alps, and receives its greatest development on the south side of the Maritime chain in the Gulf of Lyons and the neighbourhood of Nice; but there are several spots where it occurs also in the Pennine and Lepontine chains, especially at Bellinzona in the canton of Ticino, where the land sinks to the comparatively low elevation of 646 ft. above the sea-level. The vine zone is also clearly defined, but the boundary between the one above, namely, the walnut or lower hill zone and that of the beech or upper hill zone, is very difficult to discern, except to an experienced botanist. All the other zones are, however, easy to identify by reason of the very distinctive character of their vegetation. In some parts of the Alps, though, I may here observe, on account of the ruthless destruction of many of the more extensive forests of deciduous trees the conifers have taken their place, and thus frequently occur at a lower elevation than the proper region to which they belong. The character of the accompanying vegetation will, however, help one to determine the zone with sufficient accuracy for our purpose.

The olive zone is the equivalent of the warm temperate region of the horizontal isotherms, while the vine, the lower hill and the upper hill zones represent the cold temperate region; the lower alpine, the sub-arctic; the upper alpine, the arctic; and the snow zone, the polar regions, respectively. By means of the preceding table the entomological student, who only possesses a rudimentary knowledge of botany, may be able to tell at a glance the particular zone that he is in by the general aspect of the vegetation by which he may be surrounded. For the list given I am indebted to the admirable and learned compilation on the 'Natural History of the Alps,' by that veteran traveller I. von Tschudi. As regards the scientific importance of a knowledge of the vertical distribution of the Rhopalocera, and its value in studying their origin, geographical distribution, and morphology, these are themes with which I propose to deal in some future paper on the same subject.

Table illustrating the Vertical Zones in the Alps, with their characteristic Vegetation and average Elevation above the sea-level.

Vertical zone.	Characteristic Vegetable productions (upper limits).	Pennine and Lepontine chains. South side.	Alps of Valais.	The Grisons.	Alps of Berne, Uri, Glarus, St. Gall, and the Tyrol.	The Jura.
Olive zone ..	Olive, orange, lemon, rice	Up to 800 ft.	—	—	—	—
Vine zone ..	Vine, maize, tobacco, apricot, peach, quince	Up to 2600 ft.	Up to 2650 ft.	Up to 2500 ft.	Up to 1800 ft.	Up to 1600 ft.
Lower Hill zone (or walnut zone)	Walnut, sweet chestnut, white mulberry, damson	Up to 3600 ft.	Up to 3500 ft.	Up to 3450 ft.	Up to 2900 ft.	Up to 2900 ft.
Upper Hill zone (or beech zone)	Beech (upright), cherry, chicory, wheat, pear, hemp, oak, buckwheat, yew, apple, lime, juniper, elm, ash, black poplar, bean, millet	Up to 4750 ft.	Up to 4500 ft.	Up to 4500 ft.	Up to 4000 ft.	Up to 4200 ft.
Lower Alpine zone (or pine zone)	Sycamore, barley, rye, oats, larch, cedar, potato, cabbage, silver fir, aspen, summer rye, turnip, flax, mountain ash, birch, silver-leaved alder, hawthorn, spruce fir	Up to 7600 ft.	Up to 6650 ft.	Up to 7050 ft.	Up to 6250 ft.	Up to 4750 ft.
Upper Alpine zone (or rhododendron zone)	Alpine alder, rhododendron, whortleberry, bilberry, alpine juniper, dwarf pine, gentians, saxifrages, primulas, &c.	Up to 8000 ft.	Up to 7500 ft.	Up to 7500 ft.	Up to 7500 ft.	Up to 7000 ft.
Snow zone ..	(Line of congelation) ..	9000 ft.	8500 ft.	8500 ft.	8500 ft.	—

Birmingham, October 20th, 1895.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 274.)

Cirrhœdia xerampelina, *Hb.*—Rare, but apparently distributed widely; though I have no southern localities. Belfast, one; Castlewellan Park, two, Co. Down (*W.*); Dundalk, Castle Bellingham (*Thornhill*), and Drumcar (*Rev. Harpur Crewe*), Co. Louth; Enniskillen, a few (*S.* and *Capt. Browne*); Killynon

(*Miss R.*), Co. Westmeath; Courtown and Greystones, Co. Wicklow; Bessborough Park, Carrick-on-Suir, two; Markree Castle, and elsewhere near Sligo, rare; Clonbrock and Ardrahan, Co. Galway, scarce.

Tethea subtusa, *Fb.*—Bred by Capt. Browne from larvæ taken near Enniskillen.

Calymnia trapezina, *L.*—Found in widely scattered localities, but singly or in sparse numbers. Irish examples are usually characterized by pallid ochreous (rarely reddish) coloration and faint marking. Some from Markree and near Sligo are greyish fuscous, with well-marked fascia and lines. The pale outlines of the two stigmata in these are visible. I have a curious aberration from Clonbrock, bearing a dark longitudinal streak joining the lower ends of the two stigmatal areas, which are not, however, outlined. Single or occasional examples have been taken in the following places:—Near Dublin; Tinahely, Co. Wicklow (*Bw.*); Rockview and Killynon, Co. Westmeath, well marked and sometimes not scarce (*Miss R.*); Armagh (*J.*); Castle Bellingham (*Thornhill*); Drumreaske, Co. Monaghan; Favour Royal and Stewartstown, Co. Tyrone; Hollybrook, Markree Castle, and Sligo; near Derry (*C.*); Glenarm and Ballycastle, Co. Antrim; Killarney, &c., Co. Kerry; Clonbrock, Co. Galway, not rare.

Calymnia affinis, *L.*—Very rare in Ireland, although common in the sister country. Single examples have been taken at Powerscourt (*B.*); Rathfarnham, and Howth (*G. V. H.*), Co. Dublin; near Derry (*W. E. H.*); Clonbrock, Co. Galway (*R. E. D.*).

Dianthœcia luteago, var. barrettii, *Dbl.* — Mr. Birchall records as follows:—"This fine insect, discovered at Howth by Mr. Barrett in June, 1861, and described by H. Doubleday in the 'Entomologists' Annual' for 1864, p. 124, is not known to have occurred either in England or upon the Continent. Four specimens have been captured: the first, a male, by Mr. Barrett, and the others, one male and two females, by myself." Subsequently Mr. Buckler procured some ova and bred a specimen of the imago (E. M. M. Aug. 1879). His careful and accurate account of the larva and its habits, published by the Ray Society, 1895, leaves nothing to be desired. The figure is excellent, but perhaps the dots are too strongly given, as these disappeared in the specimens I have had when nearly full-fed, and the hairs are scarcely to be seen with the naked eye. The dorsal circulatory canal and that of the intestine show more clearly in some individuals than others. In the very young larvæ the second segment bears a dark patch, which grows fainter and more suffused as it gets older, until in the full-fed caterpillar it is of a honey-yellow tinge, without definite outline. The ovum is of a honey-yellow, nearly globular, but somewhat flattened equatorially, and has a depression at the apex. Under the microscope it is seen to be covered with minute pittings, like the top of a thimble, arranged in lines radiating from the apex. The larvæ are discernible within the pellicle on or about the eleventh day, and emerge the following. I placed some eggs in a flower of *Silene maritima*, on which the young larvæ, when hatched, crawled about. Two were then removed to a leaf, upon which they crawled down to the axil and commenced to burrow into the joints. It is unnecessary to supplement Mr. Buckler's description further, except to say that I noticed that if a larva exhausts a rootlet, and is short of food, it will rise to the surface of the earth, wander among the foliage, and feed upon the shoots where they enter the earth until it has found a new supply of root-provender. When disturbed (which is only injurious in the very early stage), it will curl its head round to the tail, and jerk itself from side to side. According to the abundance of food the larvæ mature irregularly. For instance, on Sept. 23rd I had three pupæ and six larvæ of uneven sizes, and on October 3rd three larvæ were still left. The pupa is of paler yellow than that of *D. capsophila*, and proportionally is larger and stouter in the thoracic half; but the abdomen is somewhat more elongated, and the segments more deeply divided, terminating in a forked spike. The wing-cases, legs, and antennæ form at their extremity a projection which is quite free from the abdomen, which appears to be a character common to the Dianthœciæ, but is more salient in this species than in any I have knowledge of. Pupation often takes place close to the food-plant, but sometimes the larva wanders about for a while, and then pupates close to the surface. Usually the adjacent particles of earth are connected together by a very slight film of threads, but sometimes no definite cocoon is formed. In *D. capsophila* similar habits obtain, but the cocoon is much more firmly bound together. The moth often is very active and fidgety on emergence, and the wings expand in about fifteen minutes, and are at first of a purplish tinge on the blacker portions, which fades after. That it is an isolated maritime form of *D. luteago* I am now quite convinced, though no trace of the bright ochreous colour of the type has been preserved. In one example, however, on emergence, a faint yellowish tinge was noticeable, especially in the claviform stigma, which faded in a few weeks. Graslin found the larva of the type feeding in the stems and roots of *Silene inflata*, and he describes it as constructing a cocoon of earth fastened together. There is a variety *argillacea* from the Ural and S. Pontus, "viel dunkler" (*Hoffmann*), "multo obscurior," Stgr., which I have not seen. *D. luteago* is found rarely in S. Germany, and also occurs in Switzerland, S. Russia, Italy, and Corsica. It is very rare in France, Paris, Montpellier, Hyères, Indre, Saone-and-Loire

(*Berce*). The light-yellow type therefore occurs for the most part in inland continental localities, whilst the melanic var. *barrettii* so far is only known from the coast-line of Great Britain and Ireland, namely, Howth and the coast of Waterford, Portjack and Onchan Bay, Isle of Man (*Gregson*, 'Brit. Naturalist,' Feb. 1892), Ilfracombe, Cornwall, and Pembrokeshire. A specimen from the latter locality, in the cabinet of Mr. Barrett, is small and dark, with very indefinite stigmata and markings. This is the only British example I have seen, but I believe none vary in the direction of the typical coloration. A parallel instance of melanism under similar influences is presented by the next species. We are led to the inference that with certain species, and possibly certain genera, a maritime environment is conducive to obscure coloration. Further instances of similar nature will be referred to in due course. The emergence of *D. luteago* is given by Hoffmann ('Die Schmetterlinge Europas') as May and August. Berce ('Faune Ent. Fr. Lépidoptères') gives May, June, and August. Apparently therefore it has two periods of emergence. Var. *barrettii* flies from the beginning of June to the close of July, and is usually to be taken flying to the flowers of *Silene maritima* at dusk, or occasionally settled after dark, probably in the act of oviposition. But it likewise may be taken by lamp-light, dashing up to the illumination, and as rapidly retreating without resting. The flight is extremely swift, and it requires a keen eye and supple wrist to catch a specimen in full flight, when standing on the face of a steep incline, or peering over the verge of a beetling cliff at night. In the net it rests much more quietly than *D. capsophila*. My reasons for considering the insect to belong to the genus *Dianthœcia* are quoted by Mr. Tutt in his 'British Noctuæ.' Buckler classed it with the Luperinæ, chiefly beeause *luteago* was relegated to that genus by Guenée, and because they were thought (erroneously, I believe) to be internal feeders. The Dianthœcian characters I rely on are shortly as follows :—1. Its feeding on species of *Silene* (root by preference, stems, foliage, and capsules when necessary). 2. The characters of the larvæ and date of emergence of the imago, being two months in advance of that of all the French Luperinas except *virens* and *dumetorum*, which fly July to August, as against May and June (*luteago*, Berce). 3. The characteristic protuberance at the tip of the wing-cases of the pupa, which I understand is not present in *luperina*. 4. The antennæ, which are slightly ciliated in both sexes, those of the males of *luperina* being much more deeply pectinated than those of *D. luteago*. 5. The hind wings of both sexes being clouded both in the type and more distinctly in the variety, a characteristic of *Dianthœcia* as opposed to that of *luperina*. 6. The presence of the characteristic pale spot near the anal angle of the hind wing, discernible in var. *barrettii*, though in our melanic var. of *D. cæsia* it is obsolete, but well marked in its continental type. 7. The tufted abdomen. All these are well-recognised Dianthœcian characters; but it still remains a question what should be the strict definition of *luperina*, given so indefinitely in such text-books as I have reference to, and continental authors differing so widely in the species included.

DIANTHŒCIA CÆSIA, *Bork.*, var. MANANI, *Gregs.*—This species is to be found in all suitable spots on the rocky coast-line of the South of Ireland, from Hook Point to Dingle Bay, as well as the Isle of Man, which possesses a distinctly Irish fauna, and probably was once conterminous with or nearer to the now subsiding east coast of Ireland. The cliffs of Antrim, Derry, and Donegal still await investigation, little work having been done there either by myself or others. As with our form of *D. luteago*, the Irish form of *D. cæsia* is distinctly melanic, the greyish blue of the Swiss type being darkened to a dingy slate-grey. Some of our specimens exhibit a parallel mottling to that of Borkhausen's type, the ochreous central fascia being reproduced by a paler suffusion, occasionally showing some trace of yellow; the basal patch and a portion of the waved antemarginal band of the type being sometimes also suggested. In the S.W. extremity of Ireland, on the Blasket Islands and elsewhere, very dark blackish blue unicolorous forms occur. The first capture of this species in Ireland in 1867 closely followed Mr. Gregson's discovery of the insect in the Isle of Man, one larva being taken by Mr. Warren Wright at Tramore, from which he bred an imago, which was submitted to Mr. Birchall, and notified in his Supplemental Irish List of 1872. No other Irish records were added till 1883, when I had the pleasure of taking the imago at Tramore and eleven other southern stations, among which Minehead, Ballycottin, Roches Point, Old Head of Kinsale, Galley Head, cliffs near Glandore, Dursey Island, and the Blaskets are the most notable.

(To be continued.)

"THE KILLING AND PRESERVATION OF INSECTS."

By B. STAFFORD-CHOPE.

IN the July number of this year's 'Entomologist' (*ante*, p. 205), a correspondent writes asking for information upon some very important points respecting the killing and preservation of insects. No replies to those queries have, to the best of my knowledge, been forthcoming up to the present; but I think this subject should not be allowed to drop without some attempt being made, through the medium of the 'Entomologist,' to answer the chief points upon which Mr. J. R. Cattle asks for information.

With regard to killing. There is, I think, no doubt but that the cyanide-bottle, kept in good condition and not allowed to retain damp, is the best mode of killing insects of all orders; but in the case of some of the larger moths, such for instance as the Sphingidæ, an injection of strong nicotine will be found more quickly effectual. A simple method for administration is to dip the point of a needle in the nicotine of a pipe, and make a puncture underneath the thorax of the insect, after the latter has been stupified by strong ammonia or chloroform fumes. The cyanide-bottle is quite harmless to the colours of all insects, with the exception of some "greens," such for example as the green of the "emeralds." To kill such insects, I consider bruised laurel shoots are better than the vapour of chloroform, which is apt to make the wings so rigid as to render the difficulty of setting properly very great. If it be desired to set an insect immediately after killing, oxalic acid will prove to be the best poison, as there seems to be little or no *rigor mortis* consequent upon the use of this acid.

As to preservation. The most important point about the preservation of insects primarily is, that they should be allowed to remain upon the setting-board until they are quite dry; and, in the second place, I think it is a great mistake not to periodically (say once a month) remove the glass-tops from the drawers of the cabinet to allow exposure of the specimens to the free atmosphere of a well-aired room, in which the cabinet should be kept. Never place specimens from other collections in the cabinet without previously dipping them in corrosive sublimate in alcohol, or some like preparation. Under these conditions moulds and mildew need not be feared. The cabinet should be constructed of mahogany in preference to oak, for oak is much more subject to gather and hold damp than mahogany. Corrosive sublimate in alcohol is the best thing to paint the bottom of the drawers of the cabinet with; and although it is absolutely fatal to insect life, it is doubtful as to how long it remains a preservative. If the drawers of the cabinet be kept well aired and the cells well filled with naphthaline, no mites need be feared. All insects (except perhaps those of a delicate green colour, which are usually affected by very little) imported from foreign collections, however, should be dipped, as described by Mr. Cattle, in corrosive sublimate in alcohol before being introduced into the cabinet.

As to grease. There is no doubt that grease is, as Dr. Guard Knaggs holds, a result of decomposition; and as far as my experience goes there is really no certain preventive. It is certainly advisable to stuff the bodies of all large moths before the contents become hard, as the Rev. Joseph Greene suggests in 'The Insect Hunter's Companion,' pp. 77, 78. As a cure for grease I would recommend slaked-lime, used in the manner described by Mr. J.

T. Fountain (*ante*, p. 303), which treatment, to my mind, is far the most quick and satisfactory. Benzole is also used in museums with some success.

The preparation of larvæ by the method of inflation is far from proving satisfactory, either in the retention of shape or colour. Of the process suggested by Mr. Cattle I have had no experience, but it strikes one as being feasible. Spirits of wine would, no doubt, be better than turpentine, which would affect some colourings in hairs; but the experiment will have to be tested before anything definite can be said upon the subject, although, doubtless, some professors may have already tried both methods, and will give us information upon the results.

Colyford, Devon, Nov. 4th, 1895.

NOTES ON ORTHOPTERA.

By C. W. Dale, F.E.S.

Forficula pubescens, Géné.—This earwig may be easily known from the common one by the wings being abortive. It occurs chiefly among reeds on the south coast, the localities being Bonchurch, Weymouth, Charmouth, Scilly Isles, and probably intervening places if searched for. It was first taken by my father on Sept. 28th, 1837. That it is not entirely confined to the coast may be seen from the fact that one was taken at Salisbury by Curtis, and a couple have been taken in my garden at Glanvilles Wootton.

Mecostethus grossus, Linné.—In an article on British Orthoptera (Entom. xxii. 197), Mr. Miller states that "it is said to occur in fields, but is probably not a native of this country." Mr. Briggs (Ent. Mo. Mag., Nov. 1895) states that "previous to the present year only three specimens seem to have been recorded from Great Britain during the present half-century." However, in the 'Young Naturalist,' vol. vii., and Ent. Mo. Mag. xxvi. 34, I recorded it as occurring on the Dorset Heaths. The last specimens I took were in the Isle of Purbeck, on July 27th, 1880; and I have no reason to doubt that it still occurs there. My father used to take it commonly at Whittlesea Mere, and also on Parley Heath, and in the New Forest. It is apparently a local species, being confined to the wettest and most boggy portions of heath-land; and has occurred in the west of Ireland, and in the counties of Dorsetshire, Hampshire, Huntingdonshire, Cambridgeshire, and Norfolk, and in former years in the marshes close to London. Some uncertainty has arisen owing to the name of *grossus* having been applied in former years to the common grasshopper, and that of *flavipes* to this species.

Œdipoda cærulescens, L.—Has been taken at Southampton, supposed to have been brought over in garden produce from the Channel Isles, where it is fairly common.

Pezotettix pedestris (Entom. xxii. 196) is only *Stenobothrus parallelus*, Zett.

Tettix bipunctatus, L.—May be found all the year round, as it hybernates amongst dead leaves.

Gomphocerus rufus, L.—This is rather a local species, and is recorded by Mr. Eland Shaw (Ent. Mo. Mag. xxv. 420) as occurring at Maidstone, Boxhill, and Reigate. To these localities I may add Battersea Fields, where it was taken early in the century by Samouelle; and the New Forest, where it was taken by my father on August 12th, 1827, and October 1st, 1830.

Decticus verrucivorus, L. — To Mr. Shaw's localities of Rochester, St. Margaret's Bay, and Christchurch (Ent. Mo. Mag. xxvi. 97) I may add the New Forest, where a fine male was taken by my father on July 3rd, 1844.

Platycleis grisea, Fab. — Seems to have a partiality for the rest-harrow (*Ononis arvensis*).

Nemobius sylvestris.—This cricket seems to be confined to the New Forest, as I have not heard of its occurrence elsewhere in England.

Glanvilles Wootton, Nov. 2nd, 1895.

NOTES AND OBSERVATIONS.

On Breeding Arctia caia for Varieties.—For some years past I have reared numbers of this moth, both first and second broods, in the hope, like Mr. George Stanley Morley (*ante*, p. 312), of obtaining "varieties." My departures from the type are two only, and are not worth mentioning when one sees Newman's figures, or the marvellous "tigers" in Mr. Capper's collection at Liverpool. They are both females, and are first-brood specimens. In each the spots and blotches are boldly developed, the basal row of spots on the lower wings forming a broad, black, transverse bar. Now for the upper wings. In No. 1 the chocolate blotches are not of a deep tint; the central one is three-lobed, the three lobes reaching the costal margin. The pale markings are pure white. No. 2. Chocolate blotches dark; central one three-lobed, the three lobes reaching the costal margin. The pale markings are ochreous. My experiments have always included rearing from the egg on specific plants, since varieties have been supposed to be the outcome, to some extent, of a somewhat unnatural diet. I have, for example, reared a second brood, *all types*, on walnut leaves. As I write (Nov. 6th) I have imagines emerging (on a shelf a yard from the kitchen fire) fed up exclusively on elder, but all terribly typical. I see Mr. Morley's first emergence in this brood took place twelve days after spinning up, four days earlier than mine. Many of my larvæ are only in their third stage, and are now evidently hybernating, in spite of their warm quarters. One by one I examined each member of the first broods, and set it at liberty if typical. The second broods are not so satisfactorily dealt with. They must be killed. To turn them out would be to meet a lingering death. My experience shows that the plant theory of producing varieties is an exploded myth, and I intend trying it no more. To those who wish for striking forms I would say—breed, either from exceptionally light- or exceptionally dark-coloured parents. The only difficulty is to get the selections; and even after the difficulty has been overcome, you are open to discomfiture, any day, by someone showing you a most marvellous form of the insect—captured, and sold for a mere song, by some novice. Experience shows that certain species, including *A. caia*, vary much more in some localities than in others. The variety *olivacea*, for instance, of *Polia chi*, we do not take in Cheshire, but they do in the county of Durham. And if varietal forms of *Nemeophila plantaginis* are wanted, I should recommend Winchester rather than Doncaster or Witherslack. I have never been able to breed from the forced second brood of *A. caia;* and I am obliged to conclude that a second brood is not produced in this country naturally.—J. Arkle; 2, George Street, Chester.

A Convenient Ammonia-bottle for Field use.—I have found an ammonia-bottle made in the following way of great use:—Take a wide-mouthed bottle, such as is used for cyanide, cut three or four bits of lint to fit the inside, and put them in the bottom; next get a tapering bit of wood,—a pen-holder does very well,—oil or grease the last inch of it, and put it resting upright on the lint in the bottom of the bottle, steadying it with two bits of cork in the mouth of the bottle, pour in enough plaster of Paris mixed with water to cover the lint an inch deep; when dry remove the pen-holder, the removal being facilitated by the grease previously applied; this leaves a hole in the plaster of Paris leading down to the lint. When required for use, with a pipette (I employ the instrument used for filling stylographic pens) introduce a few drops of strong liquid ammonia (liquor ammoniæ fortior) through the hole in the plaster of Paris so that it soaks into the lint underneath; when the hole is plugged with a bit of cotton-wool or the plaster covered with a bit of lint, the bottle is complete and ready for action. If used often the ammonia will have to be renewed frequently; about twelve drops are sufficient for an afternoon's work; a single drop of chloroform in the bottle every half-hour or so when in use increases the efficiency, and curtails the period of the death-struggle; in fact, small Geometers drop dead almost instantly. When lint and plaster become saturated, all that is required is to put the bottle (with the cork out) in an oven till all is dry again. For day work, especially among Geometers, it is very useful, and also for net work at night. The insects are in a beautiful state of relaxation, and fit to be set at once; they should be taken out of the bottle as soon as dead, as, if left in many hours, the colour of a good many suffers. For sugar, of course, it is useless, a single application of the bottle causing a general stampede. N.B.—Care must be taken not to breathe the fumes given off by the ammonia, as the effects of a deep inhalation would be, to say the least, unpleasant. —N. F. Searancke; Mitcheldean, Nov. 10th, 1895.

[Our correspondent very kindly sent us one of these bottles already charged with ammonia. Although it came to hand on the morning of the 12th, no opportunity of testing it occurred until the 15th, when it was found to almost instantly kill some specimens of *Hybernia* that were placed in it.—Ed.]

CAPTURES AND FIELD REPORTS.

Larvæ of Sphinx convolvuli from Cornwall.—I had the pleasure of receiving yesterday, from the same source as the previous four reported, *ante*, p. 311, thirteen more larvæ of *S. convolvuli*, two of which, I am sorry to say, succumbed to the journey or cold. In size they range from full-fed, or nearly, about four inches long, to one of little more than an inch. Another of the original four went to earth last Wednesday, and, with the exception of one or two, all the rest are feeding freely in a warm room. — W. T. Sturt; West House, Queen's Road, Kingston Hill, October 27th, 1895.

Sphinx convolvuli in Surrey.—Two examples of *S. convolvuli* were brought to me in the early part of September.—(Rev.) J. E. Tarbat; Weybridge, Nov. 4th, 1895.

Sphinx convolvuli in Gloucestershire.—Several specimens were seen and one taken in this village during the last week of September.—R. W. Fitzgerald; Court House, Uley, Dursley, Gloucestershire.

Sphinx convolvuli in South Wales.—A male specimen of *S. convolvuli* was brought to me when at Langharne, Carmarthenshire, in September.—T. B. Jefferys; Bath, Nov. 5th, 1895.

Sphinx convolvuli in Lincolnshire.—An example of *S. convolvuli* was brought to me on Sept. 18th, but it was in very poor condition.—W. Lewington; King Street, Market Rasen.

Catocala fraxini in N. Devon.—I have great pleasure in announcing the capture of *Catocala fraxini* on Sept. 9th. It is a freshly emerged male, and measures nearly four inches across the wings. It was captured by my friend E. M. Eustace, of Westward Ho, in his garden, and is now in my possession.—O. F. E. Cooke; Southmoor, Westward Ho, North Devon, Nov. 12th, 1895.

Accidental Aberration of Euchelia jacobææ?—On June 10th last, I bred a female example of this species, in which the crimson of all the wings was replaced by a brick-red; left hind-wing dwarfed. It seems to be an accidental aberration.—Frank Bromilow; Bournemouth.

Acherontia atropos in Lincolnshire.—I had six full-fed larvæ of *A. atropos* brought to me in September, and I have heard of nine others being taken in this neighbourhood. — W. Lewington; King Street, Market Rasen.

Hesperia comma, &c., in Lancashire.—Mr. Moss, of Windermere, captured a specimen of *H. comma* on the Lancashire side of the lake, close to the Ferry Hotel. He has also bred a good many specimens of *Sesia sphegiformis* at Windermere, not far from the railway station. Sugaring seems to have been a great success, judging from the results obtained by Lancashire collectors. Among other insects taken was a curious specimen which my good friend G. Lotxam captured and brought to me. I fancy it must be a variety of *Xylophasia sublustris*, but no typical specimens of this species have been taken. My son found a specimen of *Epunda lutulenta* in his tobacco pouch, where it must have crept while he was lying on the grass.—J. B. HODGKINSON; Nov. 15th, 1895.

PIERIS DAPLIDICE IN KENT.—I took four examples of *P. daplidice* at Deal, in August this year, under the cliff towards Dover, one on one day and three on another, all ragged examples.—C. SWINHOE; Avenue House, Oxford, Nov. 14th, 1895.

COLIAS EDUSA IN 1895: ADDITIONAL RECORDS.—

Devonshire.—During a three-weeks' stay in South Devon in the month of October, I found *C. edusa* fairly abundant, though only one specimen of the var. *helice* was noticed. Those specimens of the type captured as late as Oct. 25th were in excellent condition, which points to a third brood. On the same day I saw also examples of *Vanessa cardui* and *Chrysophanus phlœas*, in addition to the usual *V. atalanta.*—(Rev.) J. E. TARBAT; Weybridge, Nov. 4th, 1895.

Hampshire.—On Aug. 15th, on the Golf-links at Bournemouth, I caught three males, and saw one or perhaps two others. On Aug. 17th, near Holmslea in the New Forest, I took one female.—W. J. LUCAS; 25, Knight's Park, Kingston-on-Thames, Nov. 12th, 1895.

Kent.—A friend took two female *C. edusa* on Aug. 8th (one var. *helice*); these were disturbed from grass, as the day was very windy, and insects were not on the wing; the *helice* he first took for a "white;" but luckily followed and captured it, when he was agreeably surprised; on the 16th another typical female, 22nd another *helice*, 28th one male, and Sept. 3rd a male and female. It will be seen that of the seven specimens caught only two were males, which is rather unusual. Several others were seen. I saw one on Aug. 18th, and on Sept. 21st took two, besides seeing four or five others in the trenches round the Castle here, but these were poor specimens, being much worn. The last I saw was on Oct. 14th, flying swiftly along a bank by the Castle. This day I took a fine *M. stellatarum* at rest on a wall.—H. DOUGLAS STOCKWELL; 2, Albert Road, Dover, Nov. 16th.

Suffolk.—I saw one specimen of *C. edusa* on Sunday morning, Aug. 18th. Also one was seen near Glemsford station, about a mile from Cavendish.—(Miss) M. WILSON; Cavendish Rectory, Suffolk, R.S.O., Nov. 5th, 1895.

Surrey. — During August and September G. B. Cooper and other young friends of mine took about a dozen male specimens near Claygate and Guildford.—W. J. LUCAS.

Sussex.—While staying at Eastbourne in October I took a fine male, also an example of var. *helice.* They were feeble and easy to take.—H. M. EDLESTEN.

LATE SPECIMENS OF COLIAS EDUSA IN BRITAIN.—At the last October meeting of the South London Entomological and Natural History Society Mr. Carrington and Mr. Frohawk reported fresh specimens of *C. edusa* on the south coast, Oct. 20th. In a recent note concerning the species in West Sussex, Mr. W. M. Christy states: "Specimens were taken here up to Oct. 17th; and again one example was captured on Oct. 28th. A friend took one at Chichester on Oct. 30th. All were absolutely fresh." The Rev. J. E. Tarbat (*supra*) records three specimens Oct. 25th. In the 'West Sussex Gazette' (kindly communicated by Mr. Christy), the Rev. Dr. Arnold records a specimen taken by Miss Hipkins, at Bacton, on Nov. 1st. Mr. Carrington informs me that he saw a lovely specimen flying briskly on Nov. 9th near Shoreham in Sussex; and Mr. McArthur reports the species "in some numbers during the present month (November) between Rottingdean and Shoreham, last date the 13th." Turning to late records in previous years, we find that in 1877 (an *edusa* year) specimens were captured in November up to the 4th at Folkestone, on which date a very fresh specimen and also a pair *in cop.* were taken, and to the 17th at Hastings. On Oct. 28th, 1883, a male specimen was captured in a meadow between Cookham and Maidenhead. Although the species had been observed in September that year in many parts of England from Devonshire to Nottinghamshire, it was not really common in any of the localities reported. In 1884 *C. edusa* was recorded as very abundant at Lulworth, Dorsetshire, during the second and third weeks of October; it had been taken in various parts of the country during August and September, but does not appear to have been observed earlier in the year. In 1892 *C. edusa* and *C. hyale* were more or less abundant throughout England, and the former species was seen as late as Nov. 3rd at Littlehampton and Nov. 10th at Sidmouth. The following year *C. edusa* was again with us in some numbers, and was seen as early as March 29th at Seaton, in Devonshire, and early in April at several places. The latest specimens recorded that year were Oct. 12th (abundant at Sidmouth) and Nov. 2nd (several at Seaton). At the last-named locality specimens were seen each month, except August, from March to November.—Richard South.

Second Brood of Nemeobius lucina.—On June 3rd Mr. Helps, of Forest Hill, and myself, collected some seven dozen ova of *N. lucina*, which we fed up on primrose, cowslip, and the garden polyanthus. They all pupated during the third week in July. On Oct. 20th and Nov. 3rd Mr. Helps bred two imagines, and one of mine emerged on Nov. 7th; all were females. The pupæ were in both cases kept out of doors.—Walter A. Pearce; West Dulwich, S.E.

Larvæ in Surrey and Kent.—Larvæ of *Vanessa polychloros* and *Diloba cæruleocephala* were common here in June. During August and the early part of September I took the following larvæ near Ashford, in Kent:—*Acronycta leporina* (on sallow), *Demas coryli*, *Chærocampa porcellus*, *Gnophria rubricollis*, *Dasychira pudibunda*, *Drepana lacertinaria*, *D. cultraria* (*unguicula*), *Pterostoma palpina*, *Notodonta dictæoides*, *N. dromedarius*, *N. ziczac*, *Cossus ligniperda*, and *Euclidia mi.*—E. A. Brackenbury; Cranleigh School, Surrey.

Sugaring in the Cotswolds, 1895.—From June 4th to Oct. 14th I sugared some fifty times with rather poor results, considering that this locality is supposed to be particularly rich in Lepidoptera. Common insects occurred very plentifully, *Triphæna pronuba*, in particular, was seen by the hundred on some nights, from ten to forty on each tree, almost to the exclusion of everything else, and in endless variety, from pale ochreous to nearly black, mottled, &c. Subjoined is a list of species taken:—*Thyatira derasa*, *T. batis* (one fresh example taken Aug. 21st), *Acronycta megacephala*, *A. ligustri* (scarce), *A. rumicis*, *Leucania lithargyria*, *L. comma*, *L. pallens*, *Xylophasia lithoxylea*, *X. monoglypha* (swarms), *X. hepatica* (common), *Cerigo matura* (rare), *Mamestra brassicæ*, *Apamea didyma* (very common and varied), *Miana strigilis* (common), *Grammesia trigrammica* (common, beginning of June), *Rusina tenebrosa*, *Agrotis segetum*, *A. exclamationis*, *Noctua plecta*, *N. c-nigrum*, *N. festiva*, *N. rubi*, *N. xanthographa* (very common, but only seen for a week or so), *Triphæna fimbria* (rare), *T. comes* (common), *T. pronuba* (hundreds), *Amphipyra pyramidea* (common), *A. tragopogonis* (swarms), *Mania typica*, *Orthosia macilenta*, *Anchocelis rufina*, *A. pistacina* (common and varied), *A. litura* (common), *C. vaccinii*, *Scopelosoma satellitia* (very common in October), *Xanthia fulvago*, *X. aurago* (common on Oct. 1st), *X. circellaris* (in great numbers), *Calymnia trapezina*, *C. affinis* (rare), *Miselia oxyacanthæ*, *Agriopis aprilina*, *Euplexia lucipara*, *Phlogophora meticulosa* (common), *Aplecta prasina* (rare), *A. nebulosa*, *Hadena protea*, *Calocampa exoleta* (rare), *Xylina ornithopus* (very common in October), *Boarmia repandata*, *Iodis lactearia*, and *Camptogramma bilineata*. Most of my sugaring was done on the edge of an oak-wood which lies at a considerable height above this village. I used methylated spirit instead of rum to mix with the treacle, and found it answer admirably, insects being much less skittish than when rum is used. —R. W. Fitzgerald; Uley, Dursley, Nov. 2nd, 1895.

Notes on Crambites, 1895.—*Crambus falsellus* bred from pupa found in a silken cocoon among *Tortula intermedia*, at Sandy, Beds, the beginning of June; imagos at Skegness, July. *C. pratellus* common at Sandy and Ely, June and July. *C. hortuellus*, Skegness and Southend in July; larva in moss at Waterhead, Cambs, in May. *C. culmellus*, Southend, July. *C. latistrius*, Skegness, August. *C. perlellus*, Southend, July. *C. selasellus*, Stuntney Fen, Ely, and one at Skegness, July. *C. tristellus*, common at Ely end of July; also Skegness, plentiful in East Fen, Lincolnshire, August. *Chilo phragmitellus*, Ely. *Schænobius mucronellus*. Ely, July. *S. forficellus*, by side of ponds near Skegness, July. *Homæosoma binævella*, Southend (one), July. *Pempelia palumbella*, Skegness, August.—Albert H. Waters; Devonshire Road, Cambridge.

Notes from Shropshire.—My son caught a specimen of *Vanessa c-album*, which he brought to me, in a garden here, on Sept. 23rd. He saw two or three others, but was unable to capture them. On Friday, Sept. 27th, I took another in the same garden, but saw no others. The next day, Sept. 28th, I spent the whole morning searching in various gardens for this butterfly, but in vain. There were lots of plums lying about, but not a single specimen of *V. atalanta* or *V. c-album* could I see, although the former species had been very abundant a few days previously. Three *V. urticæ* were the only Vanessæ I saw. The day was very hot and sunny, and *Pieris rapæ* was very numerous. I imagine the Vanessæ had gone into hybernation; possibly this early move was due to the abundance of fruit enabling them to lay in sufficient stores more rapidly than usual.—F. C. Woodforde; Market Drayton, Salop, October 20th, 1895.

Notes on the Season.—I have not had as many opportunities as usual during the past season of getting out after Lepidoptera, but on each occasion that I did so I was struck by the absence of even some of the usually common Diurni. I paid several visits to Abbott's Wood, Polegate, but there was hardly anything to be seen except a few *Epinephele ianira* and *Lycæna alexis*. *Melitæa athalia* was very scarce, and so was *Thecla* *rubi*. *Ino statices* was plentiful at the beginning of June, and a month later *Colias edusa* and *Gonopteryx rhamni* were now and again to be seen. About the middle of August I took a fresh example of *Argynnis selene* in the White Fields. In other parts of Sussex I have noticed the same dearth of butterflies, and have failed to meet with many familiar species. I have not seen a single *Vanessa io* the whole summer, and it was only last week that I noticed two magnificent specimens of *V. cardui* near Lancing, evidently freshly emerged. *V. atalanta* has been plentiful, and *Lycæna corydon* and *L. bellargus* (*adonis*) were to be found in August, in their special localities. The early spring butterflies were very scarce, and I noticed *Euchloë* (*A.*) *cardamines* in one locality only, while *Argynnis euphrosyne* was decidedly few and far between. The larvæ of *Cossus ligniperda* have been obtained in large numbers in Brighton, both this season and last, chiefly from poplars, and at certain spots on the downs those of *Bombyx rubi* have appeared in enormous quantities. A few larvæ and pupæ of *Acherontia atropos* were obtained by my young friend, Miss Lilian Cardinall, in September, from potato fields here and at Portslade, who also, early in August, took two fine *Sphinx convolvuli* in the neighbourhood of St. Catherine's Point, Isle of Wight, and specimens of *Melanargia galatea*, *Limenitis sibylla*, *Vanessa polychloros*, *Colias edusa* and var. *helice*, at Parkhurst Forest, as well as *Argynnis paphia*, *A. adippe*, and other commoner species.—W. H. Blaber; 34, Cromwell Road, Hove, Sussex, Oct. 21st.

Collecting in the South.—Bournemouth, besides being a most enjoyable watering-place, is perhaps even more attractive for lovers of natural history, it being almost the metropolis, as it were, of all branches of that interesting pursuit. The six weeks that I spent there in April and May proved the best weather possible for collecting purposes. The large expanses of heath, many of which, however, sad to say, are being completely spoilt by continuous building, gave ample work for the net. Upon them all *Anarta myrtilli* darts like lightning, occasionally settling on the heather for a moment: it is in this moment that you must make your swoop or drop the net over it; the latter method is not very advisable, as the insect nearly always feigns death and drops into the heather, whence it will not rise for from five to fifteen minutes: a fine exercise of patience! *Cœnonympha pamphilus*, *Thecla rubi*, *Lycæna ægon*, *L. agestis*, *L. alexis*, *Dicranura vinula* (larvæ), *Notodonta ziczac* (larvæ), *Lithosia mesomella*, *Spilosoma mendica*, *S. fuliginosa*, *Nemeophila russula*, *Arctia villica*, *Bombyx rubi*, *Saturnia pavonia* (and larvæ on sallow), *Boarmia cinctaria*, *Nemoria viridata*, *Eupithecia nanata* (and larvæ), *Panagra petraria*, *Scodiona belgiaria*, *Ematurga atomaria*, *Bupalus piniaria*, *Pachcynemia hippocastanaria*, *Aspilates ochrearia*, *Thera variata*, *Coremia ferrugata*, *Melanthia ocellata*, *Eubolia plumbaria*, *Agrotis strigula* (sugar), *Rusina tenebrosa* (sugar), *Euplexia lucipara* (sugar), *Hadena oleracea* and *H. contigua* (sugar), were amongst those taken on the heaths in various ways. Light did not produce anything very grand, the chief captures being *Pachnobia rubricosa* (in May!), *Cucullia umbratica*, *Lophopteryx camelina*, *Odontopera bidentata*, *Eupithecia vulgata*, and *Pachcynemia hippocastanaria*. Sugar, too, was disappointing, the few things that were taken being mentioned above. Several most interesting expeditions were made to the New Forest, with Brockenhurst as the centre on every occasion. Rhinefields and Stubby Copse were the two most favourite directions. The famous rhododendrons at the first-mentioned place, though not fully out, were already attractive to

Macroglossa fuciformis, of which we managed to net a fair number in the best possible condition, one solitary *M. bombyliformis* finding its way to the flowers and the net. At Stubby the latter insect was in some abundance, two specimens *in cop.* being taken on the wing by a friend. Insects seemed rather scarce, especially Geometers. *Pieris brassicæ*, *Gonopteryx rhamni* (in plenty), *Colias edusa* (three seen), *Argynnis euphrosyne*, *A. selene*, *Nemeobius lucina*, *Zygæna loniceræ*, *Lithosia aureola*, *Euchelia jacobææ*, *Nemeophila russula* (female), *Spilosoma mendica*, *Tephrosia biundularia*, *T. punctularia*, *Venilia macularia*, *Ellopia prosapiaria*, *Nemoria viridata*, *Iodis lactearia*, *Zonosoma porata*, *Cabera pusaria*, *Bupalus piniaria*, *Thera variata*, *Lomaspilis marginata*, *Melanippe rivata*, *Larentia olivata*, *Anticlea rubidata*, and *Cidaria suffumata* complete the list of those taken at the two former places. An unproductive trudge to Hohensleigh, in the hope of taking *Gnophria rubricollis*, wearied and disappointed us, though a couple of *Boarmia roboraria* just saved the day from being an utter blank.—C. T. Nash; Standish Vicarage, Stonehouse, Gloucester.

Collecting in 1895.—As this season has been, so far as we have been concerned, an unusually good one, a list of the chief captures may perhaps be of some interest. A visit to Darenth Wood at Easter furnished us with *Brephos parthenias*, and at sallow *Tæniocampa munda* and other common moths. In April *Selenia illunaria* was common at Willesden. May provided no fresh species in the above neighbourhood, but a visit to Lyndhurst at Whitsun for four days proved very successful, our finds being as follows:—*Lycæna argiolus* (one battered female), *Scodonia belgiaria*, *Aspilates strigillaria*, *Venilia maculata*, *Bupalus piniaria*, *Larentia pectinitaria*, *Anaitis plagiata*: all the foregoing were netted. At sugar we obtained *Thyatira batis*, *Xylophasia rurea*, *Grammesia trilinea*, *Agrotis exclamationis*. A sheet hung up in the woods attracted only *Spilosoma menthastri* and *Odontopera bidentata*. The following larvæ were beaten:—*Tæniocampa munda*, *T. miniosa*, &c., *Agriopis aprilina*, *Amphipyra pyramidea*, *Cymatophora flavicornis*, *Asphalia ridens*, *Brephos parthenias*, *Geometra papilionaria*, *Nyssia hispidaria*, *Himera pennaria*, *Phigalia pilosaria*, and others. During June and July sugar at Willesden attracted *Rusina tenebrosa*, *H. marginatus*, and *Noctua triangulum*. In August *Bryophila perla*, and *Agrotis aquilina* were taken at Banbury, the latter at light. At Turnstead, in Essex, sugar on the night of the great thunderstorm in August produced *A. pyramidea*, *N. c-nigrum*, and *T. orbona*. In the same parish we found several larvæ of *Dicranura furcula*, a fine *Vanessa polychloros*, and, at light, *A. plagiata*. At Willesden, during August, *Catocala nupta* and *Mania maura* turned up at sugar, also on the night of a thunderstorm. At Willesden, in September, *N. c-nigrum* and *Miselia oxyacanthæ* came to sugar, and we took the following species on gas-lamps between Kingsbury and Neasden (adjoining Willesden):—*Gortyna flavago*, *Xanthia silago* and *X. cerago*, *Anchocelis pistacina* and *A. lunosa*, *Eugonia tiliaria* and *E. fuscantaria*, *Himera pennaria*, and *Cidaria miata*. In October, so far, we have taken at light, at Neasden, *Diloba cæruleocephala*, *Oporabia dilutata*, and *Hybernia defoliaria*; also *Phlogophora meticulosa*, *Anchocelis pistacina*, and *Cerastis spadicea*. A fine larva of *Bombyx rubi* was found in a field near Edgeware. Altogether, being the possessors of only a small collection, we have reason to be well satisfied with the results of this season's work.—A. R. and R. H. Heath; Willesden, Middlesex.

SOCIETIES.

Entomological Society of London.—*Oct. 2nd*, 1895.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. George H. Carpenter, B. Sc., of the Science and Art Museum, Dublin; and Herr Paul Krantz, of Pretoria, Transvaal, South Africa, were elected Fellows of the Society. Mr. McLachlan exhibited, on behalf of Mr. Bradley, of Birmingham, the specimens of Diptera attacked by an entomophthorous fungus of the genus *Empusa*, of which an account had recently appeared in the 'Entomologist's Monthly Magazine' for August, 1895, p. 178. Mr. H. Tunaley exhibited specimens of *Lobophora viretata* from the neighbourhood of Birmingham. Specimens of the green dark form were shown in their natural positions on the bark, and specimens of the yellow form were shown on leaves on which they rested. Mr. J. W. Tutt exhibited, for Mr. Anderson, of Chichester, cases formed by a lepidopterous insect received from the Argentine Republic, which he said he recognised as being either identical with, or closely allied to, *Thyridopteryx ephemeræformis*, which did great damage to many orchard and forest trees in North America. Mr. Tutt also exhibited a series of *Lycæna ægon* captured by Mr. Massey, of Didsbury, on the mosses in Westmorland. The males were remarkable in bearing two very distinct shades of colour. The females also differed considerably from the form occurring in the South of England. He also exhibited a long series of *Hydræcia lucens*, captured on the mosses near Warrington, and for comparison a series of *H. paludis;* and he read notes on the various specimens exhibited. Dr. Fritz Müller communicated a paper entitled "Contributions towards the history of a new form of larvæ of Psychodidæ (Diptera) from Brazil." Baron Osten Sacken communicated a paper, supplemental to the preceding one, entitled "Remarks on the homologies and differences between the first stages of *Pericoma* and those of the new Brazilian species." The Rev. A. E. Eaton also contributed some supplementary notes to Dr. Fritz Müller's paper on Psychodidæ. Lord Walsingham read a paper entitled "New Species of North American Tortricidæ." In this paper twenty-nine species were dealt with, of which twenty-six were described as new, from Florida, California, N. Carolina, Arizona, and Colorado. The paper also included certain corrections made by the author in the nomenclature of genera.—David Sharp, *Acting Secretary*.

Oct. 16th.—Professor Raphael Meldola, F.R.S., President, in the chair. Sir Gilbert T. Carter, K.C.M.G., of Government House, Lagos, West Africa; and Mr. Sydney Wacher, F.R.C.S., of Dane John, Canterbury, were elected Fellows of the Society. The President announced the deaths of Prof. C. C. Babington, the last but one of the original members of the Society, and Prof. C. V. Riley, one of the ten Honorary Fellows of the Society, and commented upon their scientific work. Mr. W. F. H. Blandford spoke at some length on the valuable services rendered by the late Prof. Riley to the cause of Economic Entomology, and referred to the enormous number of papers and memoirs on the subject which he had contributed. Lord Walsingham also spoke as to the importance of the late Prof. Riley's work, and the respect and regard which he had for his estimable personal qualities.

Mr. F. C. Adams exhibited a series of nineteen *Merodon equestris*, containing several varieties, showing their resemblance to wild bees of the family Apidæ, and made a few remarks on mimicry. He also exhibited specimens of *Leptomorphus walkeri*, Curt., taken in the New Forest in September last, and *Melanostoma hyalinatum*, Fln. (male and female), from a series of eighteen also taken in the New Forest in the latter part of August last. Mr. Adams further exhibited a specimen of *Spilomyia speciosa*, Rossi, from the New Forest. Mr. Verrall, Dr. Sharp, and Colonel Yerbury made some remarks on these species and their distribution. Mr. Enock exhibited, and made remarks on, specimens of the mature male and female, and the nest of *Atypus piceus*, the British trap-door spider; also male and female specimens of *Andrena atriceps* and males of *A. fulva*. Mr. Tutt exhibited a long series of 143 males and 25 females of *Erebia nerine*, captured in the Tyrol, partly in the Mendel Pass and partly in the Val d'Ampezza, and read notes on the species, in which he criticised the description of it, and the published observations as to its habits, by Dr. Lang, Mr. Elwes, and others. Mr. Elwes made some remarks in reply. Lord Walsingham exhibited the types and paratypes of *Pseudodoxia limulus* (Rghfr.), together with the larval cases and a preserved larva. His lordship directed attention to the curious truncate concave head of the larva, which forms an operculum to the tube, and remarked that the cases of this insect, which were apparently not uncommon in Ceylon, the larva feeding on mosses and lichens, had been known for some considerable time. So long ago as 1864 Mr. McLachlan found them in the British Museum collection of cases of caddis-worms, and at that time, being only acquainted with the case, he was disposed to consider them the work of one of the Leptoceridæ. In 1889 Herr Rogenhofer gave the name *Fumea ? limulus* to the case and its contents, and Mr. McLachlan agreed from the evidence then adduced that the insect was lepidopterous rather than trichopterous. Mr. C. J. Gahan exhibited, for Mr. Turner, an imago and some larval forms of *Ledra aurita*, Linn. Mr. G. C. Griffiths exhibited, and read notes on, hybrids between *Platysamia cecropia* (male) and *P. gloveri* (female), and between *P. cecropia* (male) and *P. ceanotha* (female); also between *Actias luna* (male) and *A. selene* (female). He stated that these hybrids were bred by Miss Emily L. Morton, of New Windsor, New York, in 1891, 1892, and 1893. Lord Walsingham stated that at the last meeting of the Society some discussion ensued, after the reading of his paper, in consequence of his having stated that *Grapholitha*, W., was preoccupied by *Grapholitha*, Hb. (Verz. Schm.); and he read a supplementary note on the subject explaining the references in his paper. Dr. A. G. Butler communicated a paper entitled "Notes on Seasonal Dimorphism in certain African Butterflies."—H. Goss, *Hon. Secretary.*

November 6th, 1895. — The Right Honourable Lord Walsingham, LL.D., F.R.S., Vice-President, in the chair. Mr. Cecil W. Barker, of Malvern, Natal, South Africa; and Lieutenant H. G. R. Beavan, R.N., of the Royal Naval College, Greenwich, S.E., were elected Fellows of the Society. Lord Walsingham announced the death of Mons. E. L. Ragonot, President of the Entomological Society of France, and, since 1887, a Foreign Fellow of the Entomological Society of London.

He remarked that Mons. Ragonot was especially distinguished by his knowledge of the Phycidæ (a Monograph on which group he had brought out in Russia), for his amiable personal qualities, and the readiness he showed to assist other workers in the identification of species. In conclusion, Lord Walsingham said that the loss of Mons. Ragonot would be greatly felt not only by the Entomological Society of France, but by entomologists all over the world, and that the Council had that evening passed a resolution to the effect that the Secretary should write a letter of condolence to the French Entomological Society on the death of their distinguished President. Colonel Swinhoe also spoke as to the great loss sustained by the death of Mons. Ragonot, and of the kindness and generosity of the deceased which he had personally experienced. The Secretary read a letter from Mr. Waterhouse, calling attention to the prospectus of a Monograph by Mr. Ernest Green on the Coccidæ of Ceylon. A copy of the prospectus and specimen plates were shown, and Lord Walsingham and Mr. McLachlan commented on the importance of the proposed work and the beauty of the plates. Mr. Ernest Green, who was present, made some remarks in acknowledgment. Mr. Stevens exhibited two larvæ, supposed to be those of a species of *Anobium*, which had been damaging oil paintings in his possession; also two specimens of a luminous species of *Pyrophorus*, which he had received alive from the West Indies. Mr. Adkin exhibited a portion of a collection of Lepidoptera made in Hoy, Orkney, in 1895, including the following species, viz., *Agrotis vestigialis*, *A. tritici*, and *A. cursoria*, not previously recorded from Orkney; *Nemeophila plantaginis*, having the usual yellow ground-colour of the hind wings replaced by red in many of the females; *Hepialus humuli*, males of the ordinary white form, bearing no resemblance to the Unst (Shetland) form, var. *hethlandica; Triphæna comes*, all very dark, all the fore wings almost black, the yellow of the hind wings of many of the specimens much obscured by blackish scales; *Noctua festiva*, showing forms of variation ranging between the pale southern and the dark *conflua* forms; *Epunda lutulenta*, some almost uniformly black, others pale grey with dark markings; *Tæniocampa gothica*, including var. *gothicina; Hadena adusta*, one almost black, others much variegated; *Thera juniperata*, many having the central fascia and apical streak very dark brown; and *Hypsipetes sordidata*, varying from blackish-brown to pale green. Mr. Barrett, Mr. McLachlan, and the Chairman made some remarks on the collection. Mr. Tutt exhibited a series of *Emydia cribrum* var. *candida*, which he had bred from eggs obtained from a specimen caught by Mr. Merrifield in May, 1895, in Northern Italy. He stated that being unable to obtain *Calluna vulgaris*, the ordinary food-plant, he had tried the larvæ with knot-grass (*Polygonum aviculare*), and had no difficulty in rearing them. The Rev. Canon Fowler exhibited, on behalf of Professor Poulton, living specimens of *Diapheromera femorata* bred from eggs received from Professor E. B. Titchener, of Cornell University, New York. He stated that the young larvæ had emerged from the eggs in July and August last and fed on lime. Several pairs had arrived at maturity, and were feeding in cases in the Oxford Museum. The Rev. J. H. Hocking exhibited a specimen of *Xylina zinckenii* (*lambda*), taken by him at sugar on the trunk of an oak tree at Copdock, near Ipswich, on Sept. 30th last. It was in beautiful condition, and had apparently only recently emerged from the chrysalis. He also exhibited two specimens of *Xanthia ocellaris* taken at the same time. Mr. Barrett referred to the few recorded captures of *X. zinckenii* in this country. Mr. R. W. Lloyd exhibited male and female specimens of *Amara alpina* from Garvell, Perthshire. Colonel Swinhoe stated that he had, during the past summer, captured four specimens of *Pieris daplidice* at Deal. He said they were worn, and had probably been blown over from France. Mr. Tutt remarked that he had collected at Deal for many years, but had never met with *Pieris daplidice.* Mr. Tutt read a paper, communicated by Professor A. Radcliffe Grote, entitled "Notes on the genus *Cidaria.*" Dr. T. A. Chapman read a paper entitled "Notes on Pupæ; *Orneodes*, *Epermenia*, *Chrysocorys*, and *Pterophorus.*" Lord Walsingham, Mr. Blandford, and Mr. Tutt took part in the discussion which ensued.—H. Goss and W. W. Fowler, *Hon. Secs.*

South London Entomological and Natural History Society.—*Sept.* 26*th*, 1895.—T. W. Hall, Esq., F.E.S., President, in the chair. The President referred to the great loss the Society had sustained by the death of Mr. W. H. Tugwell, and Mr. Adkin proposed, and Mr. Tutt seconded, that a letter of condolence and sympathy be sent to Mrs. Tugwell. Mr. Adkin exhibited specimens of *Spilosoma menthastri*, Esp., from Morayshire, of which the fore wings were a rich dark brown in colour; and a specimen of *Carpocapsa pomonella*, L., bred from a walnut. Mr. West, of Greenwich, stated that he had also bred the species from chestnut. Mr. South, a short series of *Xanthia fulvago*, L., from Macclesfield, representative of a large number bred this year; v. *flavescens* occurred in the proportion of about 1 in 20. One specimen somewhat resembled *X. flavago* in colour, but this form was very rare. Mr. Oldham, a series of *Lycæna bellargus*, Rott., from Folkestone, showing considerable blue coloration in the females. Mr. Tutt, on behalf of Mr. Massey, a long series of *Lycæna ægon*, Schiff., from Westmorland, the males showing both tinted forms, and the females most beautifully suffused with blue; long series of both the *lucens* and *paludis* forms of *Hydræcia nictitans*, Bork., from Warrington, but stated that the two forms were not taken together; long series of *Orthosia suspecta*, Hb., from Warrington, showing nearly all forms but the type; and a short series of *Celæna haworthii*, Curt., showing exceedingly well-marked dimorphism. Mr. Turner, specimens of *Calopteryx virgo*, L., from Horsham; two specimens of *Chærocampa celerio*, L., from an old collection made near Sheffield many years ago; and a specimen of *Lycæna icarus*, Rott., from Clandon, having the submarginal row of spots on the under sides of the fore wings prolonged into dashes. Mr. Carrington, the flowers of the Canadian wallflower, which had been grown in Mr. Briggs's garden from seeds picked at the head of Lake Superior. It was resolved to instruct the Council to invite each member to forward his photograph for insertion in the Society's album.

Oct. 10*th*.—President in the chair. Mr. Hy. Tunaley, F.E.S., 30, Fairmount Road, Brixton Hill, S.W., was elected a member. Mr. McArthur exhibited specimens he had taken this year in the Orkneys, *viz.*, a series of *Thera juniperata*, L., with the ground colour much whiter, while the dark markings were intensified and somewhat extended; two almost white specimens of *Melanippe montanata*, Bork.; three fine varieties of *Nemeophila plantaginis*, L., one having much darker hind wings, while another had yellowish-red hind wings with fewer dark markings; and var. *sedi*, Gn., and var. *luneburgensis*, Frr., of *Epunda lutulenta*, Bork. Mr. Winkley, on behalf of Mr. Montgomery, of Ealing, specimens of a second brood of *Argynnis selene*, Schiff., from Abbott's Wood; also a beautiful under-side var. of *Lycæna bellargus*, Rott., from Eastbourne, having a very light ground, a blue base, and many of the usual dark markings obliterated, while others were extended. Mr. Oldham, series of *Odonestis potatoria*, L., bred, from Cambs, three males being of the female coloration; also *Colias edusa*, Fb., one *Leucania albipuncta*, Fb., and suffused red *Phlogophora meticulosa*, L., from Folkestone; and black forms of *Xylophasia polyodon*, L., from Woodford. Mr. R. Adkin, a very beautiful series of *Noctua depuncta*, L., from Morayshire. Mr. Hy. J. Turner, a bred series of *Xanthia fulvago*, L., from Surrey, including var. *flavescens*, Esp., and the dark yellow form; a series of *Epinephele hyperanthus*, L., from Chattenden, including var. *arete*, Mull., and an intermediate form; specimens of *Silpha quadripunctata*, L., from the New Forest, and a dark var. of the same species from Chattenden; and a specimen of *Crioceris merdigera*, F., from the same locality. A discussion ensued upon the occurrence of *Colias edusa*, Fb., this season, and Mr. Winkley stated that Mr. Montgomery, of Ealing, had taken seventeen specimens at Eastbourne, and had already bred seventy-eight from the ova obtained.

October 24*th*.—The President in the chair. Colonel Partridge was elected a member. Mr. Frohawk exhibited two specimens of *Acherontia atropos*, L., one of which had been washed ashore in Glamorgan; and the other taken at the lighthouse of St. Agnes, Scilly. It was remarked that the species had occurred singly in many places this autumn. Mr. Oldham, series of *Mamestra brassicæ*, L., from Wisbeach and Woodford, those from the latter place being darker; two *Cosmia paleacea*, Esp., from Lancashire; *Xylina semmibrunnea*, Haw., and several other species from Folkestone. Mr. R. Adkin, two series of *Himera pennaria*, L., from the New Forest and Abbot's Wood respectively, and contributed notes. Mr. Thornhill communicated a series of observations upon a brood of *Arctia caia*, L., analysing the smaller variations shown. Mr. West exhibited a bug, *Zicrona cærulea*, L., taken by Mr. Billups on the fungus table at the Exhibition at St. Martin's Hall. Mr. Carrington and Mr. Frohawk reported having seen fresh specimens of *Colias edusa*, Fb., on the south coast, on October 20th. Mr. Edwards read a paper, communicated by Mr. Step, entitled "Notes on Sea-anemones." Mr. Turner laid on the table a full report of the Annual Exhibition, which will doubtless be printed in the yearly 'Abstract of Proceedings.'

November 14*th*.—The President in the chair. Mr. Griffith, of Bristol, was elected a member. Mr. Briggs exhibited a living specimen of the Madeira cockroach, *Panchlora maderæ*, taken in Covent Garden Market. Mr. Edwards, specimens of the rare Morphos, *M. cacica* and *M. neoptolemus*, from Peru. Mr. R. Adkin, a series of *Emmelesia* *tæniata*, St., from Co. Kerry, lighter than the English form, and a specimen of *Arctia caia*, L., from Louth, with very intense black-brown markings. Mr. H. W. Williams, a bred series of *Oporabia dilutaria*, Bork., including two very dark uniform specimens, and one with a light marginal area. Mr. McArthur, living larvæ and a recently-emerged imago of *Triphæna comes*, Hb., var. *curtisii*, Newm., from Orkney, and said all the captured ones were of that form. Mr. Turner, a specimen of *Phorodesma smaragdaria*, Fb., unique in being bred on September 26th; and several varieties of *Vanessa urticæ*, L., one of which had the central spots reduced to minute dots. Mr. Mansbridge, a series of *Scoparia basistrigalis*, Knaggs, taken at sugar in Epping Forest. Mr. Sturt, a living larva of *Sphinx convolvuli*, L., from Cornwall, with drawings of the others he had had. It was noted that one specimen was of the rare striped form of the larva. A discussion took place as to the necessity of forcing the pupæ of the larger hawk-moths. Mr. South, a short bred series of *Acronycta menyanthidis*, View., from Macclesfield, and stated that the larvæ were found chiefly on sallow, but a few were taken off birch. Mr. Ashdown, a number of Lepidoptera, including a strange var. of *Melanippe sociata*, Bork., having a light looped band from the costa, including the discoidal spot.—Hy. J. Turner, *Hon. Report. Sec.*

Chester Society of Natural Science and Literature.—The first general meeting of the winter session took place at the Grosvenor Museum on October 31st, when the opening address was given by the President, Dr. Stolterfoth, "On the Compound Eye of Insects." The lecture was illustrated by lantern slides, microscopical sections, and diagrams. The following were among the many interesting exhibits:—(1) Vertical section of an insect's eye seen through the microscope. This showed an outline of the faceted cornea, the rods, cones, retina, and optic nerve. (2) Picture of boy and girl seen through the cornea of the eye of a water-beetle, *Dytiscus marginalis*. The cornea was fixed in a microscope, and appeared starred with exact duplicates of the picture. (3) An insect, a Thrips, also seen through the prepared cornea fixed in a microscope. The cornea appeared starred with duplicates of the insect, each facet showing a picture as in no. 2. (4) Lantern exhibition slides, photographed by the lecturer, showing the pictured cornea in the above illustrations. A cordial vote of thanks was given to Dr. Stolterfoth for his interesting lecture; and the Mayor, W. H. Churton, was also suitably thanked for presiding.—J. Arkle; 2, George Street, Chester.

Birmingham Entomological Society. — *September* 16*th*, 1895.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. J. W. Smallwood, 18, Pakenham Road, Edgbaston, was elected a member of the Society. Exhibits:—By Mr. B. C. Bradley, a specimen of *Didea alneti*, the pale green form, from Sutton; also one of *Echinomyia grossa*, from Sutton, where it has not been taken before. By Mr. P. W. Abbott, *Lithosia griseola* and var. *flava*, from Norfolk, and *Hepialus humuli* var. *hethlandica*, from the Shetlands. By Mr. Valentine Smith, beetles from Braunton Burrows: *Nebria complanata* (a nice series), *Phaleria cadaverina*, and *Psammodius sulsicollis*. By Mr. Wainwright, a single specimen of *Colias edusa*, taken at Lynton in August; also *Macroglossa stellatarum*, from the same place.

October 21*st*.—The President in the chair. Exhibits:—By Mr. A. H. Martineau, a specimen of *Didea* from Nevin, N. Wales, differing in the bands from any specimen of *Didea* possessed by Mr. R. C. Bradley, and which he had referred doubtfully to *D. fasciata;* also one dark specimen of *Xylophasia monoglypha* from Solihull; also a *Chelifer*, which he had found clinging to the leg of an *Anthomyia* caught in his house at Solihull; when expanded and put into a test-tube the *Chelifer* had made many attempts to get on to the fly again, whenever the fly approached it. He also showed, and read notes upon, some abnormally early-developed *Andrena clarkella* and *Nomada borealis.* He had dug them up at Solihull, fully developed, as early as October 6th, and although he searched hard he could not even find any larvæ left, although usually the Andrenæ remain undeveloped until much later, the earliest previous dates for perfect insects being December 28th, when Mr. Bradley in 1893 got two *A. fulva* (females) and one *A. cinerea* (male), with larvæ, at Sutton; and December 30th, when Mr. Enock records having obtained *A. nigroœnea* in 1884. The earliest date on which Mr. Martineau has seen *A. clarkella* on the wing in the spring is March 18th. By Mr. W. Harrison, *Lycæna icarus* from Hampton near Bridgenorth, the females being bluish; *Trypeta cardui*, bred from galls found on the thistle, also at Hampton; and other insects. By Mr. R. C. Bradley, *Plusia festucæ* from Barmouth; also a very remarkable Geometer, which Mr. Barrett had referred with considerable hesitancy to *Thera firmata*, which was taken at Dursley, Glos., by Mr. R. W. Fitzgerald. Mr. Bethune-Baker said he did not think it was a *Thera* at all, and wished Mr. Barrett to see it again. By Mr. G. W. Wynn, *Agrotis obelisca* from Sutton; one *Xylina petrificata* from Wyre Forest, an insect quite new to the district; and a pretty variety of *Agrotis corticea* from Lapmouth. By Mr. P. W. Abbott, *Sesia scoliiformis* from Scotland and Llangollen; also *Pachetra leucophæa*, several specimens taken this year in the old locality in Kent.—Colbran J. Wainwright, *Hon. Sec.*

Nonpareil Entomological and Natural History Society.—*Second Annual Meeting.*—The business of the meeting was to elect officers and council for the following year. After the usual reports from the Secretary, Treasurer, Librarian, and Officers, the following gentlemen were elected to serve for the coming year:—President, Mr. Jackson; Vice-President, Mr. A. Norman; Treasurer, Mr. H. Blake; Secretary, Mr. F. West; Librarian, Mr. Newbery; Curator, Mr. W. Harper; Assistant Secretary, Mr. J. Craft; Trustees, Mr. Huckett and Mr. Gurney.—J. G. Craft, *Assistant Sec.*

Errata.—P. 288, line 2, for "Riffel Alps" read "Riffel Alp." P. 289, line 4 from top, for "Randersteg" read "Kandersteg." P. 301, line 14 from top, for "Mr. H. Mitchell" read "Mr. A. T. Mitchell."

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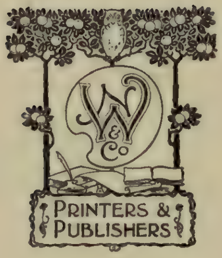
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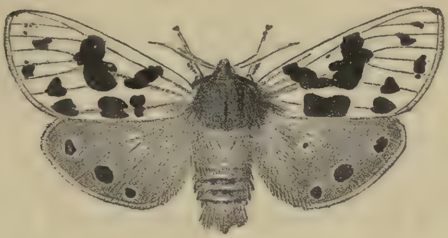
ABERRATION OF *ARCTIA CAIA.*



The above figure represents a very striking aberration of *A. caia*, which has been kindly lent me for the purpose of figuring, by Mr. P. M. Bright.

The primaries are of normal colouring, but most of the usual markings are so greatly reduced in size, and others merely indicated by spots, that it gives the specimen a very pretty and striking appearance. The secondaries are of a rose-pink orange; the usual blue-black markings are much diminished in size, and clearly outlined with lemon-yellow; the central spots of normal specimens are missing (excepting a small black speck on the right wing), and replaced by lemon-yellow blotches; the red thoracic collar is also missing, and the black abdominal bands are reduced to three.

A somewhat similar aberration is figured by Millière, Plate LIII., fig. 7; in this the markings of the primaries are greatly reduced, and principally only represented by a few dots, the boldest markings being along the hind margin; the secondaries are very like those of the specimen figured above, but of paler ground colour. Another example of this type of variation is in the collection of Mr. C. A. Briggs, and is figured in the Entom. vol. xxi., p. 73, which has only the median markings of primaries represented, and the secondaries are unspotted.

Turning to the 'Entomologist' for January, 1892, we find an entirely opposite variety figured. In this specimen the primaries are wholly smoky brown, with the exception of three small white spots on the right side and two on the left; the secondaries are more heavily marked than usual. Mr. Bright possesses a similar but more melanic specimen, in which the primaries are entirely brown and the secondaries velvety black, with rose-orange tawny along the costal area and pinkish orange on the inner margin.

F. W. FROHAWK.

December, 1895.

CARPOCAPSA POMONELLA A NUT-FEEDER.

By ROBERT ADKIN, F.E.S.

IT is upwards of a century and a half since attention was called to *Carpocapsa pomonella* as an enemy to the apple crop, and during recent years, apple-growing having become an important industry, more particularly in America and the Australian colonies, an enormous amount of evidence has been recorded regarding it. That the larva should be found to infect pears, and even the berries of the white beam-tree (*Pyrus aria*) (Proc. South Lond. Ent. Soc., 1888, p. 64), does not seem to have surprised any one; but the statement that it also attacked certain kinds of nuts appears to have been received by many with considerable doubt.

Wishing to satisfy myself on the point, I have for some years past kept a look-out for any nut-feeding lepidopterous larvæ, and hardly an autumn has passed without a few being found in walnuts; but although every possible care was taken with them, it was not until the present year that I was successful in rearing an imago, the disturbance of the larva in opening the nut probably being the cause of failure.

In the autumn of 1894 some walnuts that were sent to table were found to be infected to the extent of about six or seven per cent. of their number, but, unfortunately, the majority of them had been badly crushed before my attention was called to the presence of the larvæ. I, however, secured those that were least injured, and having satisfied myself that the larvæ were all of one species, I put the nuts together again as neatly as I could, placed them in a glass jar with some sand to await results, and was rewarded by rearing a fine example of *C. pomonella* in July last. A subsequent examination of the nuts showed that the moth was reared from one the shell of which had been but little broken, and the kernel disturbed only so far as was necessary for the examination of the larva; in all the others, which were more or less badly crushed, the remains of dead larvæ only were found. The skin of the pupa, from which the moth had emerged, was found projecting from a broken portion of the nut-shell. The species has also been bred frequently from sweet-chestnuts, as well as from walnuts, by Mr. W. West (Proc. South Lond. Ent. Soc., 1890, p. 48; Entom. xxviii. 345).

It will be noted that the only two species of nuts from which, as far as we know, *C. pomonella* has been reared, *viz.*, walnuts and chestnuts, have the seeds (*i. e.* nuts) completely enveloped in fleshy husks: is it possible that this fact can account for foods so widely different, in other respects, from the apple being voluntarily selected? or was *pomonella*, like so many of the other species of *Carpocapsa*, originally a nut-feeder, and its predilection for apples a recently acquired taste? If the latter, and more probable, should be the correct solution, we have little to fear from the ravages of this species to our nut crops.

4, Lingards Road, Lewisham, December, 1895.

THE KILLING AND PRESERVATION OF INSECTS.

By H. Guard Knaggs, M.D., F.L.S.

In your November and December issues, two correspondents, Messrs. Fountain and Stafford Chope (Entom. xxviii. 303, 332), respectively attribute to me the opinion that grease is the result of decomposition, *i.e.* of "ordinary decomposition" or putrefaction. I am not aware of having ever made such a statement, and do not believe that insects *do* putrefy under the usual conditions of being converted into specimens. Some time ago a friend asked me if I could account for the Catocalæ going putrid, and also if I could tell him how to prevent it. Not having heard of this offensive characteristic, I was unable at the time to suggest a remedy. As I could find no one who had met with a like disagreeable experience, and as the question haunted me persistently, I again paid my friend a visit, when we had a conversation somewhat in this style: "In which species of *Catocala* did you say you observed the objectionable property?" "In *promissa* and *sponsa*." "Was it a wet season when they were captured?" "No, the reverse." "Did you capture them yourself?" "No, they were sent up to me from the New Forest." "In a relaxing box?" "Yes." "There you are: damp was the solution of the enigma, for under ordinary circumstances the natural moisture of the insect would pass off into the dry atmosphere of a well-ventilated room, and desiccation would result. Putrefaction could hardly take place unless an unusual amount of humidity were present, either inherent in the specimen, or in the surrounding atmosphere."

As for grease itself being decomposed, there can be no doubt but that soon after exposure to the air it becomes oxidised, and rancidity ensues, with the formation, amongst other products, of butyric acid, which has a repulsive odour, though hardly that of putrefaction.

I do not believe in any method of preventing the formation of grease, unless it be, when rearing larvæ, to feed them on a sort of Banting system; or, with newly emerged imagines, to get them to pair, lay, and fly,—all rather risky proceedings in view of prospective specimens. But there can be little doubt as to the external appearance of grease being delayed in many cases for an indefinite period, it may be for years, and it may be for ever, by keeping the setting-house and cabinets in a cool, dry, well-ventilated room.

Not having used lime hydrate as an absorbent for grease, I can offer no decided opinion upon its merits, but should imagine that its strong alkaline and somewhat caustic qualities would render it useless for the purpose; surely magnesia carbonate is lighter, more absorbent, non-corrosive, and therefore less likely to injure the specimen. Again, these powders only act in a superficial way, they do not extract grease from the interior. To do this, repeated soakings in benzine collas or methylated ether, as recommended by Messrs. Arkle, and Christy, and in the case of the latter fluid, by myself (Entom. xxvi. 32, 109, 217; xxvii. 6), should be resorted to in the first instance; after which, if considered necessary, the powder may be applied.

There are one or two remarks I should like to offer on the subject of killing, supplemental to Mr. Stafford Chope's paper. Firstly, the burnets appear to be proof against the cyanide bottle; to use my friend Auld's expression, they positively revel in it; and my friend Sydney Webb tells me that, in their case, it actually conduces to amativeness, so that when he wants Zygænæ to pair, he pops them into the cyanide bottle with the happiest results. Secondly, it is not generally known that a puncture with vinegar is almost, if not quite, as deadly as one with oxalic acid, and of course the agent is of a harmless nature to the operator; but to me all acids seem to be objectionable. The nicotine from a foul pipe, as suggested, is very effectual, but we are not all smokers; a strong decoction of tobacco, as used by gardeners, is better. It should be kept in a small phial, to the cork of which should be attached, either a sharp-pointed grooved needle, or a sewing-machine needle; or, better still, a fine crow-quill steel pen from which one of the nibs has been broken off; an ordinary needle would leave the greater part of the poison outside the insect, and consequently its action would be much diminished.

Last season I tried a strong tincture of tobacco, mixed with an equal proportion of concentrated infusion of quassia, and it killed quickly; but until I have tried it more extensively on burnets, I don't like to praise it up too much. Next season, if all goes well, I intend to go collecting burnets; and if I can find a fluid which will despatch *them* with rapidity, it seems to me that it ought to kill anything—in the insect way.

There are other points, in the paper referred to, which I should like to have touched upon, but I have already taken up too much of your space.

189, Camden Road, N.W.

DESCRIPTIONS OF SOME NEW SPECIES OF PHYTOPHAGOUS COLEOPTERA FROM THE LOO-CHOO ISLANDS.

By Martin Jacoby, F.E.S.

Amongst a small number of Phytophaga kindly sent to me by Mons. R. Oberthur, which he received from the island of Oshima, there are several species which seem to be new to science. The fauna of these islands is, of course, closely allied to that of Japan, with which it seems to have many species in common. I recognised *Crioceris subpolita*, Motsch., *Chrysomela aurichalcea*, Motsch., and *Cryptocephalus perelegans*, Baly. The following species appear to be undescribed:—

Gynandrophthalma quadratomaculata, n. sp.

Black below, as well as the head; thorax and legs fulvous, the former impunctate; scutellum black; elytra testaceous, with four small black spots near the suture (♂), or three additional spots at the sides. Length, 2 lines.

♂. Head broad, black, finely rugose between the eyes and strigose in front of the latter; anterior margin of the epistome narrowly fulvous, triangularly emarginate; antennæ fulvous, the five apical joints fuscous, thickened, third and fourth small, equal; thorax strongly transverse, of equal width, the anterior margin straight, the posterior one slightly produced into a lobe at the middle, the sides much rounded at the base, the surface with a transverse depression near the anterior margin and some other indistinct ones near the posterior angles, impunctate, with the exception of a few punctures near the base; scutellum black, its apex distinctly raised; elytra parallel, pale flavous or testaceous, finely punctured, the punctures here and there placed in irregular rows, with four small black spots placed quadrately near the suture, before and at the middle; the under side (that of the thorax excepted) black; legs fulvous, the first joint of all the tarsi elongate.

In the female, the head is, as usual, smaller, and the thorax is less transverse, the spots on the elytra are larger, especially those of the second row which form the square, and, in addition, three others are placed at the sides, one on the shoulder, a very small one immediately below, and the third in a line with the last subsutural spot.

This species differs in the pattern of the elytra from any of its allies with which I am acquainted.

CHLAMYS GENICULATA, n. sp.

Black; the antennæ and tarsi fulvous; thorax with four longitudinal ridges in front, the base raised, broadly channelled, interstices closely punctured; elytra with two longitudinal ridges joined below the middle, the apex with two short ridges, interstices punctured like the thorax. Length 1¼ line.

Subcylindrical and parallel, black; the head flat, strongly and rather closely punctured, the lower portion rugose; the eyes deeply notched; labrum and palpi fulvous; antennæ with the apical five joints transverse, entirely fulvous, the third and fourth joints slender, equal; thorax strongly raised posteriorly into a hump, the hinder portion of which is deeply divided and transversely wrinkled, the top of each division having a strongly-curved S-shaped ridge, which extends downwards at each side towards the front, the latter also furnished with two ridges at the middle, running towards the anterior margin; a tubercle is also placed near the lateral margins, the entire interstices strongly punctured and wrinkled; scutellum strongly transverse; elytra sculptured like the thorax, the suture finely dentate; a strongly-raised ridge extends from the middle of the base below the middle and, curving round, runs upward again to the base near the suture; the sides are furnished with three short transverse ridges at nearly equal distances, and the apex has another very short slightly curved ridge near the suture, as well as a tubercle near the lateral margin; deep punctures and wrinkles fill up all the interstices; legs rather slender, the knees and the tarsi fulvous; under side closely and strongly punctured; prosternum very broad anteriorly, terminating into a narrow acute ridge, closely punctured.

The species may be distinguished principally by the colour of the antennæ, knees and tarsi, and by the very conspicuous ridge of the elytra, which at its apex turns abruptly round, running upwards again near the suture.

COLASPOSOMA OBERTHURI, n. sp.

Brownish cupreous; antennæ black, the basal joints fulvous; head rugose; thorax closely and strongly punctured, the sides rugosely punctate; elytra strongly punctured in closely-arranged rows, the sides transversely rugose. Length, 2—2½ lines.

Of bronze colour; the head closely rugose-punctate throughout, the vertex strigose, the strigæ extending to the middle of the head; antennæ extending a little beyond the base of the thorax, black, the lower six joints fulvous, the third joint longer than the fourth; thorax rather short, more than twice as broad as long, the sides evenly rounded, the surface very closely and strongly punctured, the interstices at the sides rugose or wrinkled, often confluent; scutellum not broader than long, with some distinct punctures; elytra scarcely perceptibly depressed below the base, as strongly punctured as the thorax, the punctures arranged in rather close and irregular rows, of which three near the suture towards the apex are more regular than the rest, the punctures below the shoulders and at the sides larger and closer placed, the interstices at the same places but slightly rugose; legs coloured like the upper side.

From the many other Eastern species of the genus the present one may be known principally by the very closely punctured and rugose head, in which the clypeus is scarcely separated from the face, the whole upper portion of which is covered with oblique strigæ; the sides of the thorax are also more closely punctured and rugose than most of the other Eastern species with which I am acquainted, and the punctuation of the elytra is very strong; in the female, the elytral rugosities are, as usual, much stronger, forming transverse wrinkles to the middle of the elytra at the sides, where there is also a narrow longitudinal costa visible.

CORYNODES JAPONICUS, sp. n.

Metallic green; head remotely punctured; thorax very convex, the disc closely and finely punctured; elytra with basal depression, strongly punctured in closely approached rows, claws appendiculate. Length 4–5 lines.

Of nearly parallel and subcylindrical shape; the head with a central groove, strongly but not closely punctured; the clypeus separated from the face at the sides by a short groove not extending to the middle, broader than long, its surface rugosely punctured; mandibles broad, their apex truncate, piceous as well as the palpi; antennæ extending a little beyond the base of the elytra, the lower six joints metallic, stained with fulvous, the others purplish, forming a broad five-jointed club, the apex of the terminal joint acute; thorax very convex, swollen in front, about twice as broad as long, the sides strongly rounded, widest at the middle, the angles acute but not much produced, the surface closely impressed with larger and smaller punctures, the space near the margins nearly impunctate; scutellum purplish; elytra with a distinct transverse depression below the base, the shoulders prominent, tuberculiform, the punctuation moderately strong, arranged in closely approached rather regular rows, the sides with narrow, purplish reflexed margins; tibiæ strongly rugose, the tarsi strongly widened; prosternum longer than broad, rugose.

The above description is that of the male, which, on account of the anteriorly swollen thorax, resembles a species of *Chrysochus* rather than a true *Corynodes;* this convexity is less noticeable in the female. The peculiar shape of the thorax at once distinguishes the present species, the first *Corynodes* known from this locality. Mons. Oberthur has received numerous specimens, of which he kindly sent me several for examination.

SEBÆTHE FLAVOLIMBATA, n. sp.

Flavous, the antennæ (the basal joints excepted) and the tarsi black, thorax impunctate; elytra microscopically punctured, bluish black, the lateral and apical margins flavous. Length 2 lines.

Head impunctate, the frontal elevations strongly raised, transverse; carina in shape of an acute perpendicular ridge; palpi flavous, incrassate; antennæ extending to the middle of the elytra, black, the lower two joints flavous, third joint slightly shorter than the fourth; thorax nearly three times broader than long, the sides strongly rounded with a rather broad flattened margin, the angles thickened, the surface with a broad but shallow depression at the base, the sides also more or less obsoletely depressed, the disc impunctate, flavous; scutellum triangular, flavous; elytra metallic bluish-black, the lateral margin flattened and reflexed, flavous, the apex to a slightly broader extent of the same colour; under side and legs flavous; tarsi black.

Easily recognisable by the system of its coloration.

MORPHOSPHÆRA CÆRULEA, n. sp.

Flavous; the head, antennæ, tibiæ and tarsi black; thorax with four black spots, minutely punctured; elytra metallic blue, extremely closely punctured. Length 3½ lines.

Of broadly ovate shape; the head with a few extremely minute punctures, black, with a slight bluish tint, the frontal elevations flattened, trigonate; antennæ extending to the base of the elytra only, black, the lower three joints stained with fulvous, second and third joints small, the third slightly longer, fourth and following joints pubescent; thorax nearly three times broader than long, the anterior margin concave, the sides rounded, anterior angles obtusely thickened, the surface extremely finely and rather sparingly punctured, flavous, the disc with four black spots, placed transversely at the middle, at equal distances; scutellum black, shining, elytra metallic bright blue, extremely closely and finely punctured; under side and the femora flavous; tibiæ mucronate, black as well as the tarsi, the first joint of the posterior tarsi as long as the following three joints together, claws appendiculate, anterior coxal cavities open.

This species nearly resembles in coloration the type *M. maculicollis*, Baly, but in that insect the antennæ are as long as the body, the colour of the under side is black, and the elytra are much more strongly punctured; the general size is also much larger.

MALAXIA ELONGATA, n. sp.

Flavous; the vertex of the head, the antennæ and the breast black; thorax strongly punctured, bifoveolate at the sides; elytra metallic green, finely granulate and pubescent. Length 3 lines.

Very elongate; the head rugose at the vertex, the latter black, lower portion of face flavous, the frontal tubercles rather obsolete; clypeus deflexed anteriorly; antennæ extending to the middle of the elytra, black, the lower three joints flavous below, the fourth one-half longer than the third joint; thorax flavous, twice as broad as long, narrowed at the middle, the sides rounded anteriorly, the anterior angles in shape of a small tubercle, the surface rather deeply foveolate at the sides, the centre more shallowy depressed, scarcely punctured, the sides strongly and closely punctured; elytra very elongate, metallic green, finely granulate and closely covered with very short flavous pubescence; legs and abdomen flavous; breast black.

This is the most elongate and largest species of the genus known to me.

CONTRIBUTIONS TO THE GEOGRAPHICAL DISTRIBUTION OF THE RHOPALOCERA IN THE ALPS.

By W. Harcourt-Bath.

As already announced (Entom. xviii. p. 258), I undertook a very successful entomological collecting expedition to the Pennine and Bernese Alps and Jura during the first half of July last year (1895). In the note referred to I find that I slightly underestimated the number of species of Rhopalocera which I obtained. The number of species which I observed was ninety-nine, and the sum-total actually captured amounted to ninety-seven, which figures, I venture to flatter myself, rank among the highest on record for the brief period of a fortnight, in the region under consideration. This result was owing to two circumstances, namely, favourable weather during most of the time, combined with the considerable number of different localities visited affording a variety of geological and climatological conditions.

The first four days and a half were occupied in traversing the district between Spiez, on the Lake of Thun, and Loèche-Ville, in the Rhone Valley, over the celebrated Gemmi Pass, with its glorious panorama of Alpine scenery. I then went on by rail to Zermatt, where four more days were passed, in full view of the mighty Matterhorn and all the great giants of the Pennine range. The remainder of the period, four days, was spent in the St. Niklaus Thal, in the Rhone Valley at Aigle and Le Sepey, and on Chaumont, above Neuchâtel, in the Jura. Three days and a half were absorbed in travelling to Switzerland and back, *viâ* Paris and Pontarlier.

The following is a list of the Rhopalocera encountered, with localities and notes on abundance, scarcity, &c. :—

Papilionidæ (4 species).

Papilio podalirius. St. Niklaus. Captured a female in the act of ovipositing on Alpine barberry.—*P. machaon.* Kandersteg, not uncommon.

Parnassius apollo. Abundant in most of the localities enumerated: Inden, Zermatt, Zmutt Thal, Randa, St. Niklaus, Stalden, Aigle, Le Sepey, Les Verrières and Chaumont, near Neuchâtel; very large specimens occurred at the latter.—*P. delius.* Kandersteg, not uncommon; Loèche-les-Bains, Zmutt-Thal, Riffel Alp, Staffel Alp, Gemmi Pass.

Pieridæ (13 species).

Aporia craætgi. Very plentiful at Spiezwyler, Mühlenen, Reichenbach Kandersteg, Loèche-les-Bains, Inden, Zermatt, Zmutt-Thal, Randa, St. Niklaus.

Pieris brassicæ. Nowhere plentiful except at Loèche-les-Bains.—*P. rapæ.* Not very abundant except at Aigle.—*P. napi.* Kandersteg, Gemmi Pass, Zermatt, Zmutt-Thal, Riffel Alp.— Var. *bryoniæ.* Plentiful at Kandersteg and on the Gemmi Pass; also an androgynous aberration as announced (Entom. xviii. p. 258).—*P. callidice.* Very abundant on the

Gemmi, especially in the neighbourhood of the Dauben See, near the summit of the pass, where a white species of ranunculus was flowering in profusion; also, less commonly, on the Riffel Alp and the Riffel Berg.

Euchloë belia var. *simplonia.* Single specimens on the Gemmi Pass, the Riffel Alp, and in the Zmutt-Thal.—*E. cardamines.* Scarce at Kandersteg and Aigle.

Leucophasia sinapis. Kandersteg, plentiful; Loèche-les-Bains, Visp, very abundant; Riffel Alp, Randa, St. Niklaus, Aigle, Le Sepey, Chaumont, —Ab. *diniensis.* Aigle and Chaumont.

Colias palæno. Staffel Alp and Riffel Alp. Apparently only just emerging.—*C. phicomone.* Kandersteg, Loèche-les-Bains, Zermatt, Zmutt-Thal, abundant; Riffel Alp, very abundant and exceedingly variable, some specimens being pale yellow; Randa, plentiful.—*C. hyale.* Kandersteg, Gemmi Pass, Loèche-les-Bains, Randa, Aigle, Le Sepey, Chaumont. nowhere abundant.—*C. edusa.* Spiezwyler, Mühlenen, Inden, Zermatt, Zmutt-Thal. Scarce everywhere.

Gonepteryx rhamni. Mühlenen, Aigle, Le Sepey, Chaumont. Only a few specimens seen, apparently only just emerging.

LYCÆNIDÆ (20 species).

Thecla ilicis. Inden, St. Niklaus, Aigle, Le Sepey, Chaumont; very abundant at the lattter locality.—Var. *æsculi.* Chaumont.

Chrysophanus virgaureæ. Randa, St. Niklaus, not uncommon.—Var. *zermattensis.* St. Niklaus.—*C. hippothoë.* Kandersteg, a few specimens. —Var. *eurybia.* Zermatt, Zmutt-Thal, plentiful; Randa, very plentiful.—*C. gordius.* St. Niklaus, one specimen.

Lycæna ægon. Visp, plentiful; Zermatt, Zmutt-Thal, near Randa, very abundant.—*L. argus.* Near Randa.—*L. pheretes.* Loèche-les-Bains. —*L. orbitulas.* Gemmi Pass, Riffel Alp, Zmutt-Thal.—*L. astrarche.* Kandersteg. — *L. eros.* Kandersteg, Riffel Alp, Zmutt-Thal, Zermatt, Randa.—*L. icarus.* Nowhere plentiful.—*L. eumedon.* One specimen in the Zmutt-Thal.—*L. escheri.* Near Loèche-Ville and Randa; single specimens only.—*L. bellargus.* Kandersteg.—*L. corydon,* Randa, plentiful; Aigle, Le Sepey.—*L. hylas.* Kandersteg, not uncommon; Randa, Aigle, Le Sepey.—*L. damon.* Inden, Aigle, and Le Sepey, not uncommon; Chaumont, near Neuchâtel.—*L. minima.* Mühlenen, Kandersteg, Gemmi Pass, Loèche-les-Bains, Riffel Alp.—Ab. *alsoides.* Several specimens in different localities.—*L. semiargus.* Mühlenen, Kandersteg, Riffel Alp, Zmutt-Thal, St. Niklaus.—Var. *montana.* Kandersteg, Riffel Alp, exceedingly plentiful; St. Niklaus, Gemmi Pass, Zermatt, Zmutt-Thal, abundant. — *L. arion.* Kandersteg, Gemmi Pass, above Loèche-les-Bains, Inden; nowhere plentiful. Var. *obscura.* Riffel Alp, Kandersteg, Gemmi Pass, Loèche-les-Bains, Inden.

APATURIDÆ (1 species).

Apatura iris. Saw one specimen near Aigle, on the road to Le Sepey.

NYMPHALIDÆ (22 species).

Limenitis camilla. A few specimens near Emd in good condition and apparently just emerging.

Vanessa c-album. Saw one specimen near Serrières.—*V. polychloros.* Chaumont.—*V. urticæ.* Almost everywhere.—*V. atalanta.* One hybernated specimen only.

Melitæa cynthia. Riffel Alp.—*M. aurinia* var. *merope.* Riffel Alp and Gemmi Pass.—*M. phœbe.* Randa, not uncommon; St. Niklaus, Aigle, not uncommon.—Var. *minor.* Randa.—*M. didyma.* Aigle, exceedingly abundant and very variable; some specimens approaching var. *neera;* Le Sepey, Inden, Randa, St. Niklaus, Chaumont.—Var. *alpina.* Aigle and Le Sepey, not uncommon.—*M. dictynna.* Kandersteg, very plentiful; Mühlenen, Gemmi Pass, Inden, Randa, Aigle, Le Sepey. At Randa I took an hermaphroditic specimen, in which the right side, which represents the female, is larger than the opposite pair of wings, which is the male.—*M. athalia.* Kandersteg, Inden, Randa, abundant; St. Niklaus, Stalden, Aigle, not uncommon; Le Sepey, Chaumont. Very large specimens were obtained at Aigle.—*M. parthenia* var. *varia.* Riffel Alp, very plentiful; Randa, plentiful; at the latter locality they were intermediate between the variety and the type.

Argynnis euphrosyne. Kandersteg, Gemmi Pass, Loèche-les-Bains, Zmutt-Thal.—*A. pales.* Gemmi Pass, Loèche-les-Bains, Riffel Alp, exceedingly abundant; Zmutt.Thal and Staffel Alp, plentiful; Zermatt, Randa.—Var. *napæa.* Riffel Berg and Staffel Alp.—Var. *isis.* Riffel Alp, Zmutt-Thal, Gemmi Pass.—*A. dia.* Aigle.—*A. amathusia.* Kandersteg, plentiful; Zmutt-Thal, plentiful; Randa.—*A. daphne.* One specimen at Reichenbach.—*A. latonia.* Visp, Zmutt-Thal.—*A. aglaia.* Kandersteg, Zmutt-Thal, not uncommon; Randa, Aigle, Le Sepey.—*A. niobe.* Zermatt, Zmutt-Thal, plentiful; Randa, very plentiful; St. Niklaus.—Var. *eris.* Zmutt-Thal, very plentiful; Randa, very plentiful. Everywhere more numerous than the type.—*A. adippe.* St. Niklaus, Stalden, Aigle, Le Sepey, Chaumont.—*A. paphia.* Aigle, Le Sepey, St. Niklaus.—Ab. *valezina.* St. Niklaus.

SATYRIDÆ (26 species).

Melanargia galatea. Abundant everywhere in the valleys and lower mountain region.

Erebia melampus. Riffel Alp, very plentiful; Zmutt-Thal, plentiful.—*E. mnestra.* Gemmi Pass, Riffel Alp, plentiful.—*E. pharte.* Kandersteg, Gemmi Pass.—*E. ceto.* Gemmi Pass, Loèche-les-Bains, Randa, not uncommon; near Zermatt.—*E. medusa.* Kandersteg, very abundant.—*E. œme,* Kandersteg, abundant; Gemmi Pass.—*E. stygne.* Gemmi Pass, Loèche-les-Bains, pretty plentiful.—*E. glacialis.* Riffel Berg, Gorner Grat, Gemmi Pass above Loèche-les-Bains.—*E. gorge.* Riffel Alp and Riffel Berg, very plentiful.—*E. lappona.* Gemmi Pass, plentiful; Riffel Berg.—*E. ligea.* Kandersteg.—*E. euryale.* Kandersteg, Randa, near Emd. Apparently just emerging.

Satyrus hermione. Inden, St. Niklaus, Aigle, plentiful; Le Sepey, Chaumont.—*S. semele.* In several localities; very large on Chaumont, near Neuchâtel.—*S. cordula.* St. Niklaus, exceedingly numerous; Aigle, not uncommon; Le Sepey.

Pararge mæra. Not uncommon at Spiezwyler, Mühlenen, Reichenbach, Frutigen, Kandersteg, Loèche-les-Bains, Inden, Randa, St. Niklaus, Aigle, LeSepey. The var. *adrasta* was obtained in several localities.—*P. hiera.* Two specimens on the Gemmi Pass above Kandersteg.—*P. megæra.* Kandersteg.—*P. ægeria* var. *egerides.* Kandersteg.—*P. achine.* One specimen between Aigle and Le Sepey.

Epinephèle janira. Exceedingly abundant everywhere in the lower mountain region.—*E. hyperanthes.* Abundant in most of the valleys of the lower mountain region.

Cœnonympha pamphilus. Not seen in abundance anywhere.—*C. satyrion.* Kandersteg, very plentiful; Gemmi Pass, Loèche-les-Bains, Riffel Alp. At the latter locality I obtained specimens of var. *darwiniana*, which is intermediate between this and the following species.—*C. arcania.* Chaumont, near Neuchâtel.

Hesperidæ (13 species).

Spilothyrus alceæ. One specimen near Mühlenen.—*S. lavateræ.* A few specimens at Randa, St. Niklaus, Aigle, and Le Sepey.

Syrichthus carthami. Inden, St. Niklaus.—*S. fritillum.* Gemmi Pass.—*S. alveus.* Gemmi Pass, Riffel Alp, Riffel Berg, abundant; Zmutt-Thal, Randa.—*S. cacillæ.* Riffel Alp.—*S. sao.* Single specimens at Inden and Randa.

Nisoniades tages. Kandersteg.

Hesperia thaumas. Mühlenen, Kandersteg, Randa, abundant; Aigle, Le Sepey.—*H. lineola.* Zmutt-Thal, Randa, plentiful.—*H. sylvanus.* Not uncommon in many localities.—*H. comma.* Riffel Alp.

Carterocephalus palæmon. Kandersteg and Inden.

Birmingham, Dec. 8th, 1895.

NOTE ON *DIADEMA MISIPPUS* IN TENERIFE.

By Sidney Crompton, F.E.S.

I have to announce an extremely interesting capture in this island, *i.e.*, of *Diadema misippus*, male.

It is well known to entomologists that the female *D. misippus* accompanies *Danais chrysippus* throughout its geographical range, with the exception, I believe, of the European shore of the Mediterranean. *D. misippus* has even followed *D. chrysippus* to outlying oceanic islands, both the butterflies being found at St. Helena, at Bourbon, and at Mauritius; but until now it has never been caught in Tenerife, or any other part of the Canarian archipelago, though *D. chrysippus* abounds in these islands.

The history of its appearance and capture here is as follows: About a month ago I had occasion to visit Puerto Orotava (the well-known fashionable health resort in this island) on business, and I stayed as usual at the Taoro Hotel. The hall porter (Mr. Booker, by name), knowing that I am an ardent entomologist, asked me if I had seen "the new butterfly," to which, of course, I replied "No." He then told me that he had seen a butterfly flying about the hotel garden, entirely different from any other butterfly he had ever seen here before—"very large, black, with white spots." Brother entomologists, imagine the state of excitement I was thrown into by this announcement,—I who had been diligently collecting Lepidoptera in these islands for four years, to hear of this addition to the fauna!

Mr. Booker had not only seen it, but had actually caught it one day while fluttering about the hotel steps; he had it under his hat, but in trying to secure it with his hands it escaped. Not only had the hall porter at the hotel seen it, but a friend of mine. staying there, told me later that he also had seen a butterfly (described again as "black, with white spots") flying about, quite distinct from any other butterfly he had noticed here. The English Chaplain, the Rev. Laurence Hamerton, had also seen this black and white visitor, and being an entomologist himself, had been out every day with his net to try and catch it. Mr. T. Reid, the son of the British Vice-Consul, had also seen it. So the fact seemed established, without doubt, that some new butterfly had really come to this island.

I had to leave Orotava next day to return to Santa Cruz, with rage in my heart at the stupid business which imperatively summoned me away from the scene of the new butterfly's mysterious flutterings. I had not then had the pleasure of making Mr. Hamerton's acquaintance, but my feelings towards him as I drove back to Santa Cruz were not charitable and not Christian. Why, I said to myself, should he be assiduously pursuing this prize, while I was unable to give chase as well?

I was prevented going over to Orotava again till about a week ago. Imagine my feelings when the hall porter at the hotel greeted me with the information that Mr. Hamerton had caught two specimens of the butterfly. I rushed off to the parsonage and sent in my card. Mr. Hamerton at once came out, and courteously and willingly showed me the two butterflies—two fine male *Diadema misippus*. One he told me he had caught flying in company with *D. chrysippus*.

I was again summoned back suddenly and unexpectedly to Santa Cruz, without myself having seen a specimen of *D. misippus*. However, the day after I returned, when I came back to Salamanca (the house in which I am at present stopping), I was greeted by my sister-in-law, Miss Douglas, with "What do you think? I've caught the Orotava butterfly!" And this noble girl (does not she deserve a medal from the London Entomological Society?) produced a case in which was a lively and beautiful male *D. misippus*. I did not (like Mr. Bultitude, when Dr. Grimstone told him he was to be expelled) indulge in "indecent rapture," but I felt, as Keats says—

> "Like some watcher of the night
> When a new planet swims into his ken."

And this is the true history of the first appearance in these islands of *D. misippus*. So far three specimens have been caught, all males. The female, having such a close resemblance to the *D. chrysippus*, now so abundant here, would naturally escape notice. That they will be caught later hardly admits of a doubt.

I should be inclined to think that these *D. misippus* did not reach here by flight from the nearest land where they are found—

the African coast, as both Mr. Hamerton's two specimen and mine are very fresh-looking and unrubbed, as if newly emerged from the pupa. Perhaps the larvæ were carried here by some steamer, or perhaps the pupæ.

Readers interested in this subject of the mimicry of *D. chrysippus* by the female *misippus*, are referred to Mr. Roland Trimen's paper, 'On some Mimetic Analogies among African Butterflies,' published in the 'Transactions of the Linnean Society,' vol. xxvi. Part the Third. 1869. Also to his 'South African Butterflies,' vol. i., pp. 279–280.

Salamanca, Santa Cruz de Tenerife,
Nov. 26th, 1895.

SAWFLY LARVÆ IN 1895.

By E. F. Chawner.

As far as the Lyndhurst district of the New Forest is concerned, 1895 has been a year of surprises. The spring season was very bad, many common flies being altogether absent. I only saw one *Tenthredo viridis* (a female), though I searched carefully, wishing to obtain specimens for the purpose of breeding from them. *Tenthredo livida* was quite a rarity, and I did not see a single *Tenthredopsis microcephala* where the year before they had simply swarmed. Even the ubiquitous *Allantus arcuatus* and *Dolerus gonagra* were scarce. Just a few species appeared in their usual numbers, the most noticeable being *Nematus pavidus*, *Crœsus septentrionalis* and *C. latipes*, and the larvæ of *Emphytus serotinus*. Such scarcity of flies naturally pointed to a bad larval season, at least so I supposed, but on the whole have been agreeably mistaken. The change began at the end of August with the discovery of several large hatches of *Nematus tibialis* on some young acacias growing in one of the enclosures. Where they can have come from is a mystery, for I have frequently searched those acacias, and until this season have never found any larvæ on them.

On August 29th I went to Stafford, and there reaped a really good harvest off alder and poplar, birch being most unprofitable this year, and sallow little better. From a plantation of young poplars I took a fair number of the curious larvæ of *Nematus compressicornis*, generally feeding two or three on a leaf, each individual surrounded by its remarkable "palisade," which prevents any possibility of mistaking the species. Besides these I found two unknown species, which I hope to be able to verify as flies next year. But the alders were by far the most productive. In one small thicket larvæ of *Camponiscus luridiventris* simply swarmed, hardly a leaf being without one or more of the curious flat creatures. A few full-fed *Crœsus varus*, remnants of a large hatch, judging by the appearance of the bush on which they had been feeding, several *Eriocampa ovata*, many broods of *Hemichroa rufa*, ranging from freshly-hatched to nearly full-fed specimens, and three unknown species (probably *Nematus*) represented a profitable day's work. Another treasure trove was a black larva on ash, a strictly nocturnal feeder, burrowing just under the surface of the earth by day.

The following week, on my return to Lyndhurst, I was agreeably surprised to find a good hatch of *Crœsus varus*, and another of *Hemichroa rufa*, both of which I had vainly sought for four years. It is very strange how one may go over the same piece of ground year after year, and yet find new species.

Altogether the autumn season has quite made up for the disappointments of spring. The result of both together, as regards new species taken in or near Lyndhurst, may be summarised as follows:—April to August: *Cladius padi.* August to October: *Crœsus varus, Hemichroa rufa, Nematus tibialis, Pœcilosoma luteolum ;* also four unknown kinds.

In or near Stafford, last week of August and first of September: *Nematus compressicornis* and *N. curtispina, Cladius rufipes* (one specimen), *Crœsus varus, Camponiscus luridiventris, Eriocampa ovata, Hemichroa rufa, Emphytus cinctus, Taxonus equiseti,* and four unknown kinds.

The following larvæ, usually common round Lyndhurst, were either entirely lacking, or much scarcer than usual: *Nematus abdominalis, N. ruficapillis, N. betulæ* and *N. lacteus ; Eriocampa annulipes* and *E. varipes, Hylotoma gracilicornis, H. ustulata,* and *H. rosea ; Pœcilosoma pulveratum, Dolerus næmatodis, Tenthredopsis microcephala,* and *Tenthredo viridis.*

As common as usual were the following larvæ: *Nematus pavidus, Crœsus septentrionalis,* and *C. latipes, Strongylogaster cingulatus,* and *Emphytus serotinus.* I may mention here that during five years in which I have endeavoured to rear the last named larva, I have been unsuccessful in every instance. I have tried young and full-fed larvæ, have given abundance of growing food, and earth in which to pupate. The result has always been the same. They are apparently healthy, feed well, go down with alacrity, and never come up again. I have tried keeping the earth moist and dry ; have given it them shallow and deep. Nothing is of any use. I should be very glad to hear if these larvæ are commonly considered delicate, and what is the best treatment for them.

Lyndhurst.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 331.)

Dianthœcia nana, *Rott.*—Widely spread and numerous in some localities where *Lychnis flos-cuculi*, or other food-plant, is abundant. Mr. Tutt, from want of published records, is mistaken in stating that it has been seldom taken in Ireland (Brit. Noct. vol. iii. p. 36). The Irish specimens have a very dark blackish ground colour, as noted by Mr. Birchall of the specimen sent him by Mrs. Battersby, from Cromlyn, Co. Westmeath. Mr. Tutt notices this under var. *suffusa* (*loc. cit.*), erroneously I think. Miss Reynell has also met with the same form in abundance at Killynon, in the same county, and they do not differ from a large series I took at Favour Royal, Tyrone, and elsewhere. They exactly correspond with a Scandinavian, and only differ from an Auvergne specimen in my collection, in the white patches of the latter being reduced in size. In connection with this it may be interesting to note that Berce (Faune Ent. Française) describes the ground colour as "bluish black," and the white patches conforming in size, &c., to the normal type. We see, therefore, that the reduction of the white traits is not dependent upon a northern latitude, nor the dark colour. The browner tint of British examples would seem to be rather a deviation from the commonest continental form. The var. *suffusa*, Tutt, occurs at Ballycastle, Co. Antrim, and on the same coast, a little further west, at Magilligan (*Curz.*), and Sligo (Brit. Noct.), but I have not seen this form. I took one specimen of (?) var. *intermedia*, Tutt, on the 15th May, at Rathlin I., off the Antrim coast, but it has the dentated ante-marginal line, and some markings on the base and inner margin in dingy whitish. I have seen no approach to the Shetland, Orkney, or Welsh forms with markings more or less obliterated, in Ireland, and consider that the character has probably been developed in the former islands by isolation and protective selection. It may be worth pointing out that some of these specimens show a superficial resemblance to *D. magnolii*, Bdv., where the orbicular remains distinct, and traces on the costa and elsewhere are faintly marked. This seems one of the instances in which a a variety of one species approaches the facies of another. The moth flies long before dusk to the flowers of ragged robin, or species of *Dianthus*, &c., and is wary and shy of approach, though easily taken when settled. They can fly swiftly when not searching for flowers, and evidently rely rather on sense of smell than on sight, at least while daylight continues; as, when not flying up the wind, they dodge about the herbage as if quartering the ground, without apparently being attracted by the colour of the flowers, and making for them directly. Sugar attracts this species as well as *D. cucubali*. Localities:—North coast of Derry and Antrim; Magilligan, Ballycastle, Portrush, abundant (*C.*), and Rathlin I.; Shores of L. Swilly, scarce (*C.*); Lagan Fields and Colin Glen, Belfast (*W.*), and Dunmurry (*Bw.*), plentiful; Co. Westmeath (*supra*); Enniskillen, not scarce (*S.*); Drumreaske, Monaghan; Tyrone; Armagh, scarce (*J.*); Glandore, Co. Cork (*D.*); and Old Head of Kinsale; Dursey I. and the Blaskets, ordinary form, Co. Kerry; Knocknarea, Sligo (*Russ.*); Salthill, Co. Galway (*Curz.*).

[DIANTHŒCIA COMPTA, *Fb.*—There is no satisfactory evidence for the inclusion of this species in the Irish list. Mr. Bond was under the impression that Mr. Weaver took the specimen in his cabinet in Ireland, but probably it was otherwise. There are two genuine examples in the museum of Trinity College, Dublin, which formed part of Mr. Tardy's collection, who worked chiefly in the neighbourhood of Bray; but they are not labelled, and might have been sent him by friends, as it included many undoubted English insects not of his capture, and so was not exclusively Irish. Nevertheless Mr. Birchall, who wrote after Mr. Tardy's death, seems to have been convinced of their having been taken in Ireland by him, though he could not indicate the locality of their capture.]

DIANTHŒCIA CAPSINCOLA, *Hb.* — Generally distributed and common. Though admittedly a wholly distinct species, the purple colour of the imago, and a tinge of the same in the larva of *D. cucubali* seems the only distinction. The outer edge of the reniform stigma of the latter is usually, but not always, straighter I think, than that of the species under notice. In the female, however, the very extended ovipositor of *D. capsincola* is a remarkable trait.

DIANTHŒCIA CUCUBALI, *Fues.*—Found not uncommonly and very widely throughout Ireland, and frequents the sea-coast as well as inland localities, where it seems generally more numerous. At Farnham, near Cavan, I once saw a crowd assembled near a female apparently recently emerged. It comes to sugar sparingly. As noticed by Mr. Tutt in 'British Noctuæ,' the species is a very stable one; but I have taken a melanic specimen on the Blasket Islands which, while retaining all the pencilling on the blackish ground colour, has only the slightest trace of purple perceptible. It occurred in company with melanic variations of other species, due, in my opinion, to isolation acting in concurrence with a tendency to protective adaptation.

DIANTHŒCIA CAPSOPHILA, *Dup.*—Mr. Birchall writes:—"First captured by Mr. Barrett, in June, 1860 (see 'Zoologist,' p. 7324); occurs commonly on the Hill of Howth, but has not yet been found elsewhere. The larva feeds on the unripe seeds of *Silene maritima*, from June to August; and the moth, though only single-brooded, is on the wing for the greater part of the same period. There has been much discussion as to the claims of this insect to be considered a species distinct from *D. carpophaga*, some of the darker varieties of which from Scotland approach *capsophila*, both in form and colour. The larvæ of *carpophaga* and *capsophila*, like the perfect insect, differ principally in colour, *capsophila* in both cases being the darker. The larvæ of *capsincola* and *conspersa* are, however, equally difficult to separate, and their slight variations in the larval state seem to be characteristic of the Dianthœciæ, and alone are insufficient to enable us to discriminate the species. Some may suppose that the common origin of the various species of the genus is indicated by these slight differences in the larval state; but for the purpose of classification *carpophaga* and *capsophila* seem to me to be abundantly distinct, and must be so recorded." To the above I would add, that I have taken this moth on Rathlin I., off our northern coast, so early as May 15th, and sometimes elsewhere as late as September. This habit seems conformable to that of the food-plant, which, according to its exposure, blooms from May to September. The larvæ of the later broods also hybernate, and I have dug them out of the sand-hills on April 10th, apparently almost full-fed. Probably therefore the moth is often double-brooded. Mr. Porritt took larvæ in June of all stages of growth, and many of these produced imagines in August following. The larvæ not only feed on the capsules and flowers, but when neither of these are available, on the leaves of the *Silene*. I have no proof that they ever resort to the roots. When more than half-fed, they bury themselves in the sand, or loose débris under the plant by day, and feed only at night. Since the publication of Birchall's 'Catalogue of the Lepidoptera of Ireland' in 1866, I have taken this species in twelve of our littoral counties; Mayo and Sligo being the exceptions, doubtless owing to my not having worked those coasts; and have bred great numbers from the larval stage. I have had but few larvæ of *carpophaga* to compare with them, but, from these and Buckler's figure of full-fed specimens, have come to the conclusion that in the last stage those of *D. capsophila* differ from the former in losing the dark subdorsal and side stripes. They then become an almost unicolorous dirty yellow, with only very faint traces of stripes, but with the dorsal circulatory canal distinctly perceptible. The young larvæ also are not uniform in appearance, the stripes varying greatly in their intensity in different examples. Out of all the imagines I have bred from the Irish coast, I never saw a single one which approached *D. carpophaga* in colour sufficiently to raise an honest doubt. But I have taken faded brownish specimens more than once, which were very near to the Pembroke examples bred by Mr. Blandford, kindly shown me by Mr. Barrett. Mr. Russ sent me one from Sligo which was an undoubted. *D. capsophila*, but bleached to a brownish hue. The Irish examples therefore of this species are very distinct, and though variable, from a cold grey ground (which I have taken in August, but never bred an example), and black somewhat shot with violet, to dull black with only vestiges of the stigmata and antemarginal line observable. These latter (a very melanic form) came from the Blasket Islands (see *ante*, *D. cucubali*). The lines and markings, except when obliterated, are always whitish grey, without the ochreous tone observable in *carpophaga*. On the Continent some examples have a slightly warmer ground colour, with white pencillings, of which I possess two. There is but a shade of difference between them and the majority of Irish ones. Berce describes those from Doubs and Digne, in the Basses-Alpes, as blackish grey, often slightly tinted with a yellowish brown, with white lines and markings. The dark form tallies with Guenée's var. A (*suffusa*, Tutt), and to this almost all our Irish examples are referable. Occasional trivial aberrations occur, with whitish median and submedian nervures. The Manx and Irish *capsophila* are identical. It is noticeable, in connection with the specific controversy, that in France *D. carpophaga* is more or less abundantly found throughout the low-lying provinces; but *D. capsophila* is always pretty rare, and only occurs in mountainous districts. The same appears to obtain elsewhere in Europe, unless indeed it is found in Sardinia and Corsica on the coast, and not on the mountains. If then a variety of *carpophaga*, it must be recognised as a mountain form; and we have numerous cases, especially in botanical distribution, in which mountain and sea-coast produce a parallel fauna. So far the evidence in favour of merging the two species seems essentially weak. Localities (I follow the coast-line, and omit counties, for brevity):—Howth, Ireland's Eye, Lambay I., Killiney, Bray Head, Kilcool, Wicklow Head, Rosslare, the Saltee and Keragh Is., Dunmore, Tramore, Mine Head, Ballycottin, Roches Point, Old Head of Kinsale, Galley Head, Glandore, dark forms (*D.*); Castlehaven, Crookhaven, shores of Bantry Bay, Dursey I., Dingle Bay, the Blaskets (melanic form); Liscannor, Inishmor I., Ballyvaughan, Salthill, (*Curz.*); Inishboffin I., Renvyle and Crump I., Killary Bay, Lissadel, Knocknarea (*Russ.*); Mount Charles, and near Belle Isle; Sheephaven, Shores of L. Swilly, Inishowen Head, Ballycastle (*Curz.*); Rathlin I., Copeland I., Clogher Head.

(To be continued.)

ON A NEW VARIETY OF *PROAGODERUS RITSEMÆ*, LANSB. (ONTHOPHAGIDÆ).

By John W. Shipp.

Proagoderus, *Lansb.* (Notes, Leyden Museum, 1883, v. p. 14).

Ritsemæ, Lansb. *l. c.*, p. 14.

Var. *duvivieri*, Shipp = *ritsemæ* var. Duvivier, Ann. Ent. Belg. vol. xxxviii.

Var. *duvivieri*, Shipp.—Head of a slightly golden green colour; thorax dark green, more or less golden on the convex portion; elytra black, slightly tinted with an indigo blue; legs and feet dark green. The tubercules of the head are more pronounced than in the type. Spines of anterior tibiæ rather more strongly curved. Pygidium rather more strongly punctured than in the type.

There appears to be no specific distinction otherwise than as stated above, but it is distinct enough to be regarded as a variety. Mons. Duvivier obtained his examples from Ibembo, while my specimen, which agrees with the description of Mons. Duvivier's insect, was obtained from near Stanley Falls.

Oxford.

NOTES AND OBSERVATIONS.

A Proposed New Work.—Messrs. H. Foster Newey and W. A. Rollason inform us that they are engaged in the preparation of a work on the larvæ and pupæ of British Butterflies and Moths, with careful and concise descriptions and outline illustrations of all the species, as far as possible, to form in general arrangement a companion volume to Newman's "British Butterflies and Moths." To ensure the early completion of the proposed work, they would be glad to have the assistance of entomologists in procuring the larvæ and pupæ of such species as they themselves are unable to obtain. A list of their desiderata will be found in our exchange pages. We may add that we have seen some proofs of their drawings and consider them excellent.

Tenacity of Life in Insects.—Dr. Knaggs's interesting notes on this subject (Entom. xxviii. 228) recall to my mind a case which I think is worth recording. A few seasons ago I caught a fine specimen of *Dorcus parallelopipedus*, which I placed in my cyanide bottle, and after leaving it there for some considerable time I took it out and set it. I let it remain on the setting board for a fortnight, at the end of which time I looked at it to see if it was quite dry and ready for removal. It appeared to be exactly as I had set it, not a leg had shifted; but as I did not require the board for immediate use, I thought I would leave it for another week to ensure its being thoroughly dry. When I went to remove it I was surprised to find that it had released itself from the surrounding pins, and was slowly revolving on the pin with which it was transfixed, its legs beating the air. I think it somewhat extraordinary that this insect should have revived after a full fortnight's stupor.—EDWARD RANSOM; Sudbury, Suffolk, Dec. 1895.

ALPINE VARIETY OF HESPERIA COMMA.—In September, 1894, I collected a small series of this butterfly on the Wengern-Scheideck Pass, in the Bernese Alps, at the height of about 6000 ft. above the sea level in the lower Alpine zone or region of conifers. All the specimens differ from the type in being a little larger and possessing a melanochroic tendency, the dark markings being more intense, and occupying more space at the expense of the orange-coloured blotches and spots. As this appears to be a well-marked climatic variety, and not apparently having had any name attached to it, I beg to propose that it be called the var. *alpina*. It is quite distinct from the var. *catena*, which occurs at a greater elevation in the Pennine Alps, and also in Lapland.—W. HARCOURT-BATH; Birmingham, Dec. 8th, 1895.

NOTE ON BOMBYX TRIFOLII.—In Mr. D. P. Turner's note (Entom. xxviii. 277) he speaks of the hybernation of the larva of *Bombyx trifolii*. My experience is that the larva does not hybernate at all. I have had ova the larvæ from which hatched out in the spring, but I have never found larvæ in autumn. As to food, the larvæ will eat many things in captivity, and I have reared them successfully on hawthorn, but the main thing is providing proper ventilation and light; and without these they are generally failures whatever food they eat.—GEO. A. HARKER; Grand Bassam, W. Africa, Nov. 6th, 1895.

ENTOMOLOGICAL CLUB.—A meeting was held on November 25th last at Wellfield, 4, Lingard Road, Lewisham, the residence of Mr. Robert Adkin, who occupied the chair. Several interesting species of insects were exhibited. The question of the Club's collection was again brought forward, but postponed to the next meeting for settlement. Two members and some fourteen visitors were present.

CAPTURES AND FIELD REPORTS.

XYLINA ZINCKENII IN SUFFOLK.—On Sept. 30th I took a very perfect specimen of *X. zinckenii* at Copdock. It came to sugar at 6.45 p.m. The wind was east, and the moon very bright, only three days from the full.—JOHN H. HOCKING; Copdock Rectory, Ipswich, Nov. 23rd, 1895.

XANTHIA OCELLARIS IN BRITAIN.—The Rev. John H. Hocking captured a specimen of *X. ocellaris* at sugar in his grounds at Copdock, Suffolk, on Sept. 7th, 1895, and another example came to light on the 17th of the same month and was secured. Three specimens of this insect were taken in 1893 and one in 1894 (Entom. xxviii. 133); it seems probable therefore that *X. ocellaris*, like *Plusia moneta*, has come to stay. The species is widely distributed throughout Central Europe, but is nowhere so common as *X. gilvago*. The larva is said to feed on the buds of poplar. It would be exceedingly interesting if the claim of the species to a place in the

British list could be strengthened by the discovery here of its larva.—Richard South.

A Successful Moth-trap—Some particulars respecting the working of a moth-trap which I have used during the greater part of the last season may possibly interest some of your readers. I started the trap for the first time in June, and in every way it has been a distinct success. It is after the pattern of that very successful one belonging to Major Robertson, and though it might be placed in a better position, still it has performed its duty, often in an exciting and nearly always in a profitable manner. A strong light and a good reflector are of course the two essential requisites; if the light happens in any way to become extinguished during the night many, if not most, of the inhabitants of the trap will escape, which is a drawback I am seeking to overcome. Facing a small shrubbery and a grass-field with distant hedges, it has attracted the following insects:—

June.—*Smerinthus populi, Nola cucullatella* (not scarce), *Euchelia jacobææ, Spilosoma lubricipeda, S. menthastri* (both plentiful), *Odonestis potatoria* (male and female), *Leucania conigera* (this insect I have not taken by any other method), *Lithargyria* (swarms), *L. comma, L. impura, L. pallens, Xylophasia monoglypha, X. sublustris* (only for about a week), *Miana arcuosa, Grammesia trigrammica, Caradrina taraxaci, Agrotis exclamationis, A. corticea, Noctua augur* (swarms), *N. triangulum* (this I have not taken before), *N. brunnea, N. festiva* and var. *conflua, Apamea basilinea, Habrostola tripartita, H. triplasia, Plusia chrysitis* (the metallic colours being present when the first appeared), *P. iota* (some fine forms), *Hypena proboscidalis, Uropteryx sambucaria, Rumia luteolata, Metrocampa margaritaria, Pericallia syringaria, Selenia bilunaria, S. lunaria* (1), *Hemithea strigata, Acidalia aversata, A. emarginata, Timandra amataria, Melanthia ocellata, Melanippe fluctuata, Anticlea rubidata, Eupithecia rectangulata, Phibalapteryx tersata, P. vitalbata, Cidaria miata, Eubolia bipunctaria, Cidaria fulvata, C. dotata, C. pyraliata.*

July.—*Arctia caia* (one with orange hind wings), *Bombyx neustria* (males only), *Pterostoma palpina, Lithosia complanula, L. griseola, Porthesia chrysorrhœa, Cilix glaucata, Charæas graminis, Leucania conigera, Xylophasia sublustris, X. rurea, Noctua triangulum, Amphipyra tragopogonis, Plusia iota* (getting worn), *Crocallis elinguaria, Pericallia syringaria, Boarmia repandata, Geometra vernaria, Epione apicaria* (2), *Acidalia imitaria, Ligdia adustata, Coremia ferrugata, C. unidentaria,* and many others mentioned under last month.

August.—*Pterostoma palpina, Bryophila perla, Luperina testacea* (swarms), *L. cespitis* (rather scarce), *Noctua rubi, N. umbrosa* (scarce), *N. xanthographa, Habrostola tripartita* (worn), *Neuronia popularis* (swarms of males, only one female), *Epione apiciaria* (worn), *Cabera pusaria, Timandra amataria, Triphosa dubitata.*

September.—*Gortyna ochracea, Neuronia popularis* (one female only), *Tapinostola fulva, Anchocelis pistacina* (very variable), *A. lunosa* (some very fine specimens), *Xanthia gilvago* (a few), *Epunda lutulenta* (scarce), *Eugonia quercinaria, Eubolia cervinata.*

October.—*Himera pennaria* (males only), *Cheimatobia brunata* (very early?).

November.—*Asteroscopus sphinx* (not so scarce this year, but as usual only males), *Pœcilocampa populi* (one female, several males), *Diloba cæruleocephala, Cerastis spadicea, Himera pennaria, Hybernia aurantiaria, Cheimatobia brumata, C. boreata* (2).

Close, rainy nights I have found to be the most favoured; after one such I counted nearly 500 prisoners of various kinds. The trap stands facing due north, which with our prevailing S.W. winds is an advantage, as I have continually found that insects fly against the wind rather than with it, especially Noctuæ.—C. J. NASH; Standish Vicarage, Stonehouse, Gloucestershire.

NOTES ON SUGAR IN THE COTSWOLD DISTRICT. — Seeing Mr. Fitzgerald's interesting account of the insects he has taken at sugar, and being distant only about ten miles from his district, Dursley, I mention below some of the Lepidoptera that I have turned up here at sugar in the last season. Although ten miles is a comparatively small distance, still it is enough to make some difference in the species that occur. The mixture I use is beer, foots-sugar, and essence of almonds; the latter I find very attractive. During all May and part of June I was absent from home, but from the middle of June to the end of August I sugared some fifty trees with the following result, which, though fair, might have been better:—*Leucania comma*, *L. pallens*, *L. impura*, *Xylophasia sublustris*, *X. polyodon*, *X. lithoxylea*, *X. hepatica*, *Cerigo matura* (only one; last year plentiful), *Grammesia trigrammica* var. *bilinea*, *Thyatira batis* (a single specimen), *Leucania lithargyria* (in numbers), *Hydrœcia nictitans*, *Agrotis exclamationis* (a pest), *A. segetum*, *Noctua augur*, *N. plecta*, *N. festiva* and var. *conflua*, *N rubi*, *N. umbrosa*, *Amphipyra tragopogonis*, *Mania typica*, *M. maura* (very scarce), *Mamestra brassicæ*, *Apamea basilinea* (one), *A. didyma* (a pest, in great variety), *Euplexia lucipara* (scarce). In addition to the results at sugar, the following may be of interest:—*Chœrocampa porcellus* (not scarce), *Plusia iota*, *P. v-aureum*, *Aplecta advena*, at the flowers of the honeysuckle. At the raspberry blossoms, which were more than usually attractive, these were the chief insects netted:—*Leucania impura*, *L. pallens* *Habrostola tripartita*, *H. triplasia*, *Plusia iota*, *P. gamma*, *P. chrysitis*. In the woods and high ground near here the following species made their appearance:—*Argynnis aglaia*, *A. adippe* (scarce), *A. paphia* (very abundant, some actually flying about *in cop.*), *Vanessa c-album*, *V. atalanta*, *V. cardui*, *Melanargia galatea*, *Thecla w-album* (one), *T. rubi*, *Lycæna icarus*, *L. agestis*, *Hesperia thaumas* (this, with *M. galatea*, was especially abundant on one day only), *Macroglossa stellatarum*, *Euchelia jacobææ* (larvæ most abundant), *Nemeophila plantaginis* (scarce), (*Aplecta nebulosa* (on tree-trunks), larvæ of *Cucullia verbasci*, *Toxocampa pastinum* (flying in the long grass at dusk, and attracted by light), *Metrocampa margaritaria*, *Zonosoma linearia*, *Asthena blomeri*, *Tephrosia biundularia* (scarce, though usually plentiful), *Strenia clathrata* *Minoa murinata*, *Melanippe procellata* (one), *Eubolia bipunctaria*, *Anaitis plagiata*. Larvæ have been rather scarce, the best find being one *Notodonta ziczac;* not having taken of these in the larval stage before, I was agreeably surprised. This completes my list, and it is one with which I am well satisfied.—C. G. NASH; Standish Vicarage, Stonehouse, Glos.

SPHINX CONVOLVULI IN HAMPSHIRE.—Between Aug. 11th and Oct. 2nd sixteen specimens were taken by me at Christchurch.—A. DRUITT; Christ church, November, 1895.

SPHINX CONVOLVULI IN ESSEX, 1895.—I took a fine example of this moth, hovering in front of honeysuckle in my garden at 10.30 p.m., on Sept. 3rd.—GERVASE F. MATHEW; Dovercourt, Essex, Nov. 19th, 1895.

Colias edusa in Somerset, 1895.—I saw two males flying by the side of the road, while driving from Buckland Dinham to Bath, on Aug. 29th; they appeared to be bright and fresh.—Gervase F. Mathew; Dovercourt, Essex, Nov. 19th, 1895.

Colias edusa &c., in Jersey, 1895.—During a ten days' stay in Jersey, the end of last September, with a friend, we found *Colias edusa* simply swarming, so much so that I repeatedly took four in my net at once, with a fair sprinkling of var. *helice*. We also found *Pieris brassicæ*, *P. rapæ*, *Vanessa cardui*, *V. atalanta*, *V. urticæ*, *Pararge egeria*, *P. megæra*, *Polyommatus phlœas*, *Cœnonympha pamphilus*, and *Lycæna alexis*, very plentiful, and distributed over the whole island; whilst *Satyrus semele*, *Epinephele tithonus*, *Lycæna argiolus*, *Macroglossa stellatarum*, and *M. fuciformis* were taken daily.—F. H. Wagstaff; Nov. 28th, 1895.

Pyrameis cardui, 1895.—I noticed a few worn specimens on the seabank and marshes in this neighbourhood during June and the beginning of July, and a few fresh ones in September, in clover-fields, while out shooting.—Gervase F. Mathew; Dovercourt, Essex, Nov. 19th, 1895.

Glowworms in October.—On Oct. 15th last, in very warm wet weather, while driving along the Blackdown Hills between Taunton and Honiton, about six p.m., I observed several glowworms, *Lampyris noctiluca* (female), shining brightly among the herbage at the roadside. Altogether, perhaps, a dozen were seen. Is this not unusually late in the year?—S. G. Reid; The Elms, Yalding, Kent, Nov. 20th, 1895.

Leucania vitellina in Hampshire.—I have to report the capture, at sugar, of two specimens of *Leucania vitellina* at Christchurch, One was taken on Oct. 3rd, and one on the 6th of that month. The specimens are in fair condition.—A. Druitt; Christchurch, Hants, November, 1895.

RECENT LITERATURE.

Frail Children of the Air: Excursions into the World of Butterflies. By Samuel Hubbard Scudder. 12mo. Pp. viii, 279. Boston: Houghton, Mifflin & Co. 1895.

This volume contains a selection of instructive essays, dealing with questions connected with the distribution, structure, history, &c., of butterflies, which were originally published in the same author's remarkable work on the 'Butterflies of the Eastern United States.' There are thirty-one of these papers, all written in an exceedingly pleasant style, and in each the subject under consideration is fully discussed. Several of the species referred to are British, and many of the others belong to genera occurring in this country.

We have great pleasure in calling the attention of our readers to this interesting little book.

Reports of Societies are unavoidably postponed until February.

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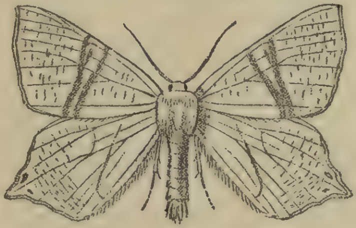
UROPTERYX SAMBUCARIA Ab.



The above figure represents an aberrant specimen of *U. sambucaria*. It was received from Wolverhampton by Mr. Percy Bright, who has been good enough to allow Mr. Frohawk to take its portrait.

A very similar variety of this species was exhibited in 1881 at the London Entomological Society by Mr. C. O. Waterhouse, on behalf of Mr. F. H. Waterhouse, who took it at Wandsworth.

In addition to the foregoing, and apart from local forms, the only other aberration of *U. sambucaria* of which I have any knowledge is a remarkable specimen from Japan in Mr. Leech's collection. In this the ground colour is fuscous grey, or perhaps, more correctly speaking, dusky drab, and the transverse lines are very little darker; fringes, and spots at angle of secondaries are normal.

Richard South.

DESCRIPTIONS OF PREVIOUSLY UNDESCRIBED SPECIES OF DISMORPHINA IN THE NATURAL HISTORY MUSEUM.

By Arthur G. Butler, Ph. D.
Senior Assistant-Keeper of Zoology, British Museum.

Enantia acutipennis, sp. n.

♂. Nearest to *E. aphrodite*, but the primaries with the outer margin much more oblique than in any of the species of the *E. licinia* group, giving the apex a more acute aspect; costal margin almost straight to beyond the discoidal cell. Wings above greenish white, slightly washed with sulphur-yellow towards the posterior angle of the primaries and on the external area of secondaries; base of costa of primaries yellow; apical border nearly black, internally trisinuate; the first sinus from costa to subcostal vein, the second to lower radial, the third to end of first median branch; a semilunar subapical spot of the ground colour; secondaries with a short black marginal border at apex; primaries below chalky white, tinted in front with sea-green; costa sulphur-yellow, inclining to saffron-yellow at apex, where the apical area of the upper surface is indistinctly visible through the wing; base of costa also slightly tinted with saffron; secondaries sulphur-yellow, slightly washed with saffron at base and on outer border; two dust-grey stripes, the upper inarched and unequally bifid beyond the cell through the upper part of which it passes, the other discal, from submedian vein almost to first subcostal branch; pectus yellow, washed with saffron at the sides; venter white. Expanse of wings, 51 millim.

Trinidad (*J. H. Hart*). ♂. B. M.

In outline this species more nearly resembles one of the many named forms of *E. melita* than any of the *E. licinia* group.

Dismorphia nella, sp. n.

Allied to *D. siloe*. Male with a deep tawny streak from base to near end of cell, traversed at its commencement by the median vein; submarginal hyaline spots small and partly obliterated, otherwise as in *D. siloe;* secondaries with a tapering black streak from the border at end of third median branch almost to the abdominal margin; female with the basal half of primaries and the secondaries tawny, as in that sex of *D. theucharila*. Expanse of wings, ♂ 60 millim., ♀ 53–57 millim.

New Granada; Bogota. Colls. Hewitson and B. M.

In the Hewitson collection a female of this species is associated with *D. theucharila*, and two males and a second female with *D. siloe;* one male is in the Museum collection.

Dismorphia discrepans, sp. n.

♂. Near to *D. amphione*, and apparently only differing from *D. beroe*, Lucas, in having the basal half of the costa of primaries ochreous, right up to the commencement of the yellow macular band;

in having the tawny area quadrifid, a fourth division appearing above the base of the second median branch; and in the entire absence of the subapical series of yellow spots; the secondaries are slightly more prolonged at apex, and there is a large apical yellow patch on the under surface, larger than in *D. amphione*. Expanse of wings, 65 millim.

New Granada. ♂. B. M.

It is possible that this may prove to be a form of *D. beroe*, but the entire absence of the subapical yellow spots on the primaries gives it a very different aspect.

DISMORPHIA RHOMBOIDEA, sp. n.

♂. Allied to the preceding. Primaries with the basal three-fifths orange-tawny, excepting a costal trifid patch over the end of the cell, intersected by thick black veins; two longitudinal black streaks, one discoidal, unequally elongate diamond-shaped; the other fusiform, and connate with the submedian nerve-edging; a quadrate black spot on the upper discocellular veinlet; apical area black-brown; secondaries nearly as in *D. praxinoe*, but the tawny interno-median belt broader, and continued with a distinct curve to outer margin, merely edged on both sides with black; the anal rufous-brown border being also clearer and broader than in *D. praxinoe*. Under surface differing from that of *D. praxinoe* in the absence of the subapical series of yellow spots on the primaries, in the large subapical diffused yellow patch on the secondaries; the upper half of the discoidal cell black; a black streak on the costal vein terminating in a large oval spot; a large irregular black quadrate patch crossed by the discocellulars; a small black-brown spot just above the origin of the second median branch, and a larger cordiform spot close to it on the lower median interspace. Expanse of wings, 72 millim.

"Nauta" (*Degand*). ♂. B. M.

It is believed that the specimens received as from Nauta were actually collected in E. Peru. In the Hewitson collection there is a pair of what I take to be a variety of this species, but he has not labelled them with their habitat; they differ in having the yellow costal spots continued as an oblique band almost to outer margin, leaving an irregular broad black streak from outer margin to above the middle of the second median branch; the female has the hind wings tawny, with quadridentate black apical border and indistinct brownish testaceous anal borders. It is probable that these specimens were collected in Ecuador by Buckley, as most of the butterflies in the fine collection obtained from him by Hewitson were never labelled with even an apology for a locality. Other examples of species in this group, in the Hewitson collection, can only doubtfully be assigned to their proper species for the same reason.

LEPIDOPTEROUS LARVÆ IN WALNUTS.

By F. V. Theobald, M.A., F.E.S.

Economic Entomologist to the S.E. Agricultural College.

Seeing Mr. Adkin's paper on *Carpocapsa pomonella* (*ante*, p. 2) as a nut-feeder (which is of interest economically), I thought that perhaps a few additional notes on larvæ in walnuts might not be out of place. For some years past I have been investigating the insect-pests of the walnut, and have found the larvæ of two moths present in the nuts, namely, *Carpocapsa splendana* and *Plodia interpunctella*. So far I have never come across *C. pomonella* myself in nuts, and am sorry to add this destructive Tortrix to the list of walnut insects.

C. splendana has been sometimes abundant in the nuts in this country, both in green as well as in ripe fruits. At first, on examining the larvæ, I came to the conclusion they were those of the apple or codlin moth (*C. pomonella*), but in all the samples of English walnuts I have examined they have turned out to be the nearly-allied species, *C. splendana*, which also feeds on the acorn and Spanish chestnut. The immature larvæ I have found in young fruit at the end of July and in August, on several occasions at Kingston-on-Thames, one tree losing quite 10 per cent. of the crop in 1892, owing to this pest. It was also plentiful at Great Staughton in August, 1894; and a few examples have occurred at Wye, Taplow, and other places in the green fruit.

In those that I have kept the larvæ lived in the nuts until full-grown, when they made their exit. This took place during September, and a few even in October. After a short time the maggots spun a pale silken cocoon at the sides of the "cages." Numbers were also found (just as we find *C. pomonella*) spun in the crevices of the walnut bark. I called attention to this species in my Report on Injurious Insects for 1894.

The second species, *Plodia interpunctella*, Hübn., or the "Indian meal moth," is also often abundant in walnuts. So far I have only had my attention drawn to it in reference to stored nuts. *P. interpunctella* is the "maggot" that we generally find, to our surprise, at dessert. Where the moth lays its eggs I do not know. According to Mr. Crittenden ('Year-book' of the U.S. Department of Agriculture, 1895), this larva attacks all manner of stored provisions—currants, roots, herbs, figs, nuts, and other commodities. These larvæ I find generally, like those of *C. pomonella* described by Mr. Adkin, and unlike those of *C. splendana*, pupate in the nuts, in a mass of silk. This Phycitid breeds somewhat rapidly in stores, five or six generations appearing in the year. The presence in walnuts of *C. pomonella* is not surprising, when we consider the other Carpocapsidæ, but nevertheless alarming: let us hope it is not going to be as serious a pest to the walnut as it is to the apple, and sometimes pear.

Wye Court, near Ashford, Jan. 3rd, 1896.

NEW EXPERIMENTS ON THE SEASONAL DIMORPHISM OF LEPIDOPTERA.

By Dr. August Weismann.

(Translated from the German by W. E. Nicholson, F.E.S.)

The following treatise contains an exhaustive account of a series of experiments, which I have made with various butterflies during the last decade, in order to obtain an assured answer to the question, which was suggested rather than solved in my first pamphlet, 'Ueber den Saison-Dimorphismus der Schmetterlinge.' I was able then (1875) to prove, what Dorfmeister had already, indeed, shown was probable for *Vanessa levana*, that with various seasonally-dimorphic species the forms, which alternate under the influence of warmth or cold, can to some extent be even converted one into the other. I had also sought to form some conception of how the phyletic origin of such dimorphism in a species could be considered as the effect of alternating climatic influences, but this was only an experiment, which I was far from considering as the final settlement of the whole question. I therefore made use of time and opportunity, when available, in order to obtain, by new experiments, more precise answers to the questions, how far the phenomenon of seasonal dimorphism in general might be produced by the direct effect of temperature, and how far changes of climate might produce permanent, *i. e.* hereditary, effects on the colour of Lepidoptera. I believe that I have now advanced a step further, and I have already expressed my present and, as I hope, more correct and complete views on these questions in one of my last writings,* relying on some of these experiments.

Had this not happened, I should have delayed the detailed publication of the experiments for some years, as we have not yet reached the end of the researches; rather new questions arise on the basis just won, which can only be answered by further series of experiments. In the meantime I feel myself obliged to bring forward illustrations of the experiments which have already served for deductions. Nevertheless I cannot neglect working at these questions again in the future, and more completely revising the material.

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* Weismann, 'Das Keimplasma, eine Theorie der Vererbung. Jena, 1892, p. 523, u. ff.

I am glad to say that I am no longer almost the only worker in this field. Acute entomologists and excellent experimenters like W. H. Edwards in America, Merrifield and Dixey in England, Standfuss and Brandes in Germany, and younger gifted men of power like E. Fischer, have devoted themselves to these questions; and so it is to be hoped, that a deeper insight may be obtained into these phenomena, and at the same time into some of the processes in the formation of a species, and that those points, which at present must remain in the stage of conjecture, at no remote time may be raised to ascertained fact.

In order to support my views, I have not hesitated to bring forward my interpretation of the facts as they are now presented to the experience of myself and others, at the risk of having to alter much of it later on, as we do not make progress by blind experiment, but only by experiment having a purpose in view; and for this we require an interpretation of the immediate facts.

If I have taken my own theory of heredity as a starting-point for theoretic considerations, this is not because I would force it upon the reader, but because at the present time it is the only theory, that has been so far worked out in detail, that it is possible with it to approach the explanation of the phenomena here in question. But a theory, that can be applied to isolated phenomena, has already achieved much, as by this means definite formulæ are obtained, which can be worked with, and which have their value even if in the future much of the theory should be proved to be erroneous, and should have to be altered. They can then be embodied in the new formulæ of the better theory without the progress, which they have brought, being necessarily lost.

Freiburg, April 30th, 1895.

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I. Experiments and Observations on Chrysophanus phlœas, L.

A. *Experiments with a Brood from Parents from the South of Europe.*

Dr. Schiemenz, of the Zoological Station at Naples, was good enough, in the spring of 1888, to capture some females of *phlœas* in the open in the neighbourhood of Camaldoli, and to obtain some eggs. Some of the eggs were reared by himself at Naples, while others were sent to me at Freiburg, and formed the material for the following experiments.

I cannot neglect the opportunity of here tendering my warmest thanks to Dr. Schiemenz for his kind support of my efforts. Any one who knows from his own experience the difficulty and liability to accident in obtaining such material for research can estimate, how far these thanks are deserved. Even from German *phlœas* I endeavoured to obtain eggs in vain for years, and when I at length succeeded it was still only a moderate number.

(1) *Neapolitan Eggs reared at Naples.*—The eggs, which were laid at Naples in the beginning of May on *Rumex acetosella*, were reared on plants grown in pots, and produced 36 butterflies between June 26th and 29th. These are all characterized by a very broad deep black margin on the upper side of the fore wings, and by very large deep black spots. Many also exhibit the black powdering of the brilliant red-golden ground colour characteristic of the var. *eleus ;* however, this latter character is very unstable, and very unequally developed. Three degrees may be separated according to the extent of the black powdering of the fore wings.

A. Darkest form. Only 3 to 5 small washed-out spots remain of the red-gold of the ground colour ; all the rest of the surface of the wings is powdered with deep black, and only exhibits scattered red-golden scales, which produce a slight golden lustre. Only slight traces of red-golden spots can be recognized outside the band of black spots. Eight specimens of this form.

B. Intermediate form. The red-golden ground colour is visible outside the band of black spots in the form of definite spots, but all the lower half of the wing is strongly powdered with black. Twelve specimens of this form.

C. Brightest form. The lower half of the wing, from the base to the band of spots, is powdered with black, which does not extend outside the same. Twelve specimens of this form.

All three forms consequently merit the name of the var. *eleus*, although they vary greatly just in the characteristic of this variation "of the black powdering of the upper side of the fore wings." This cannot be regarded as the effect of rearing in a room, but as a peculiar variability of the summer brood of *phlœas* at Naples. A specimen of *phlœas* from Greece and one from Corsica are even blacker than the variety A, as they indeed no longer have any red-golden spots, but only a slight golden lustre, which results from scattered golden scales.

I possess 71 specimens of *phlœas* from Southern Japan (Tokio), which were captured in June and July, 1887, and consequently all belong to the summer brood. All have a very broad black margin and large deep-black spots, but the black powdering of the red-gold ground colour is with them also of very varying strength. Only 3 are equal in darkness to the specimens already noted from Greece and Corsica; in many only the basal portion of the lower half of the wings is powdered with black, and 14 specimens are without any powdering, beautifully red-golden. Consequently here also great variability of the *eleus* characters prevails.

(2) *Neapolitan Eggs reared at Freiburg.*—By the kindness of Dr. Schiemenz, on May 19th, 1888, I received the first batch of eggs of *phlœas* from Naples, which were mostly laid on dry pieces of the leaf or stem of *Rumex acetosella.* These were gummed on to flowering plants of *Rumex acetosella,* where they developed quite satisfactorily in a room at a temperature from 20°–21° C., as did the eggs of several batches which succeeded one another up to May 24th. Some 70 larvæ emerged between May 22nd and 26th. These are not at first louse-shaped, but of the shape of ordinary larvæ, bright yellow in colour, and covered with a down of long hairs. They were already louse-shaped on June 4th, and of the green colour of the sorrel-leaves, some also with a bright vinous-red dorsal stripe and subspiracular stripes. They ate the chlorophyll-layer of the tender leaf from below, leaving only the epidermis. They are tardy and sluggish in their movements, and only leave a leaf, when it is entirely demolished. When they were almost full-fed (June 7th), they ate the whole leaves like other larvæ. Many remain entirely green, while others exhibit the bright vinous-red longitudinal stripes on a green ground, an adaptation of colour to the reddish stems of many plants of sorrel, the red of which is nearly of the same tint as that of the larvæ. Both forms of the larvæ thus possess excellent protective coloration.

I proved some years ago for *Vanessa prorsa-levana* that the black and yellow colouring of the larvæ, which occurs with this species, is no way connected with the variability of the butterfly. In order to preclude any such suggestion here, I reared the green and the red larvæ separately; and here also I found, *that the variations of the perfect insect are in no way related to the colouring of the larvæ.* Thirteen butterflies from the green and 22 from the red larvæ exhibited no constant differences.

From June 16th the larvæ fastened themselves up for pupation, which took place between June 21st and 28th. The whole of the larvæ were now before pupation divided into two lots, of which lot A was for the future kept in the temperature of an ordinary room, while lot B was placed in a lower temperature, in order to see what changes in the colour of the perfect insect could be thereby produced.

Lot A.—Pupæ in an ordinary room temperature. The temperature of the room from June 9th to 13th was 20° C. or a little more, and from June 14th to 22nd, 18° C. During this time 35 butterflies emerged. Of these 8 were decidedly var. *eleus;* the rest exhibited no black powdering of the red-gold, but all indeed had broader margins of a deeper black and larger black spots than the German *phlœas*, and even than Sardinian *phlœas* of the spring brood.

Lot B. — These larvæ were at the commencement of their pupation placed in the cellar or the refrigerator. As pupation at the temperature of the latter, 6–10° C., did not generally take place, they had to be taken out again, and were brought into the temperature of the cellar, at little over 10° C. Under these circumstances pupation was delayed for a very long time, and lasted over a month (from June 22nd to July 25th). The pupæ then remained in the refrigerator at from 7–10° C., where several butterflies emerged between Aug. 27th and Sept. 16th. It was evident, however, that the dampness of the refrigerator not infrequently rendered the red quite pale yellow, so some of the pupæ still remaining were brought into a room, where 18 more butterflies emerged between Sept. 17th and Oct. 18th. The rest remained in the refrigerator, and by-and-by emerged at 10–11° C., most of them crippled, although very few to such an extent, that the colour could not have been recognized. In reference to brilliancy of colour, it was all one, whether the pupæ emerged in the refrigerator or in the room.

Of the 51 butterflies that emerged, only two are somewhat powdered with black, one of which emerged on Aug. 27th, and the other on Sept. 15th. All the others are bright red-gold, and have very small black spots; but the majority have a broad and deep black margin, and especially the black of the apex of the wing often spreads to the uppermost spot of the band of spots, while at the same time it extends as a broader stripe along the costa to the base of the wing. These are characters, which are not present in German specimens; it is such a mixture of characters of the southern and northern forms as is unknown to me in specimens captured at large.

The duration of a lower temperature for a very long time does not produce any increase of the effect, that can be recognized. To be sure the two darkest specimens emerged tolerably early, *viz.* on Aug. 27th and Sept. 15th, but perfectly bright specimens emerged on Aug. 31st, Sept. 5th, 6th, 7th, and 10th, and then again some rather darker specimens on Sept. 20th.

B. *Experiments with a Brood from German Parents.*

(3) *Eggs reared at an increased Temperature.*—A female captured at Leipzig in the middle of August, 1889, laid eggs, which were forwarded to me at Lindau, on the Lake of Constance, where I received them on Aug. 20th. As I did not know, whether the eggs of *phlœas* hybernated or not, I placed them at first in an unheated room having at that time a temperature of no more than 10° C. However, the first larva hatched on Aug. 27th. Thereupon I placed all the eggs in a hothouse, in which the

temperature fluctuated between 20° and 35° C., in such a way that from evening until 10 a.m. the temperature was 20–26° C., but about the middle of the day 25–35° C. All the young larvæ now hatched: 5 on Aug. 27th, 20 on the 28th, and 9 up to Aug. 31st.

On Sept. 12th I removed to Freiburg, and placed the 35 larvæ on growing plants of *Rumex acetosella* in a warmed incubator specially constructed for the purpose, which I call a brood-incubator. The temperature in the same was kept at 27–29° C., and care was taken for the humidity of the air by evaporating water. Pupation likewise took place in the incubator, and I obtained:—

On Sept. 15th, 1 pupa at 27° C.
,, 19th, 6 pupæ at 27° C.
,, 20th, 1 pupa at 29° C.
,, 21st, 6 pupæ at 30° C.
,, 22nd, 6 pupæ at 30° C.
,, 23rd, 3 pupæ at 33° C.
,, 24th, 2 pupæ at 30° C.

Altogether 25 pupæ.

These pupæ produced 23 butterflies, *viz.*:—

On Sept. 19th, 1 butterfly at 27° C.
,, 23rd, 1 butterfly at 33° C.
,, 25th, 5 butterflies at 24° C.
,, 26th, 3 butterflies at 29° C.
,, 27th, 5 butterflies at 37° C.
,, 28th, 4 butterflies at 37° C.
,, 29th, 3 butterflies at 38° C.
Oct. 5th, 1 crippled specimen.

Altogether 23 butterflies.

The remaining pupæ did not emerge, and proved later on to be dried up. One of the butterflies of Sept. 26th escaped.

It will be noticed that the temperature in the incubator was gradually raised, namely, from 24° C. on Sept. 25th to 38° C. on Sept. 29th. The pupæ of Sicily and Greece are not often exposed to a higher temperature, as they pupate in shady places on and under stones, &c., where they are not often struck by the rays of the sun.

Of these 23 butterflies, at least 8 specimens closely resemble the ordinary German *phlœas*, so that consequently the raised temperature has made no effect upon them. Two specimens can be described as the var. *eleus*, as they are as strongly powdered with black, as many specimens of the darkest variety of the butterfly reared at Naples. Both specimens emerged on Sept.

27th, *i. e.* two days before the end of the period of emergence, and consequently were not subjected by a long way to the highest temperature (37–38° C.) immediately before their emergence, but only to a temperature of 23–29° C.

Thirteen specimens are somewhat darker than the ordinary German form. They have the black margin a little broader, and the black spots somewhat larger. The black powdering of *eleus* is also present, although generally to a very slight extent, and principally on the lower half of the fore wing from the base towards the band of spots only. A sharp distinction cannot be drawn between these specimens and the 8 unaltered ones first mentioned, and it is doubtful, whether more than 8 specimens should not be reckoned in the first group.

C. *Results of the Experiments.*

The first question to be asked is: *Does the temperature to which the pupa is subjected affect the colour of the butterfly?* This can be unhesitatingly answered in the affirmative. The eggs of the Neapolitan butterflies more frequently produced butterflies powdered with black at Naples, than when they were reared at Freiburg in a room at the ordinary summer temperature, and they resulted in butterflies without any black powdering, when the pupæ were kept at 6–10° C. On the other hand, eggs from North German females of *phlœas,* when their pupæ were subjected to 24–38° C., resulted in some few specimens powdered with black, which were quite similar to the Neapolitan specimens of *eleus.*

It is proved by experiment 2, A and B, that the temperature only produces these changes during the pupal period, and that its operation during the larval period is without effect on the colour of the butterfly, inasmuch as the Neapolitan larvæ, which were all reared at the same room temperature and first treated differently during or after their pupation, produced such strikingly different coloration in lot A and lot B. On this account it was also unnecessary for the production of the summer form, to keep the eggs of the German butterflies at an increased temperature from the beginning of and throughout the whole larval period; it was, however, necessary, in order to bring the larvæ to pupation in the late autumn, which, considering the small number of insects available for the experiment, appeared very desirable. Had the larvæ been reared at a lower temperature, and the pupæ first brought into the incubator, the result would have been almost the same. In this respect the results of Merrifield, which will be mentioned later on, agree.

The second question is more difficult to answer. It is: *Has the effect of temperature on the colour of the butterfly become hereditary?* At the first glance this might be answered with a decisive "No," if it was taken into consideration that both in Sicily (according to Zeller), as well as in Sardinia, the spring brood, even in captured specimens, is quite as pure red-gold as with us, while the summer brood is more or less dark. If we might assume that both forms of colour were adaptations, and possibly afforded protection to the insects, then it might be explained by the supposition of two kinds of determinants in the germ-plasm of the insects. But nothing can be adduced to support this; I at least cannot see what protection the darker colour of the summer form could in any way guarantee. This will not, indeed, say much for the slight insight which we have into the biological relations of the Lepidoptera; but first we shall be compelled to regard the blackening of *phlœas* by heat, as the direct effect of the latter, and not as the mere elimination of a second scheme of colour. But, if we do this, the pure fire-colour of the first brood in Sicily and Sardinia appears to prove, that the black powdering of the summer form has in no way impressed itself on the germ hereditarily.

I should, however, consider this a hasty conclusion. If we look at Experiment II. a little closer there can be no question, but that the brood of Neapolitan butterflies reared and kept as pupæ at Freiburg at an ordinary temperature generally produced much darker specimens, than the brood of German butterflies would have done under similar conditions, to be sure much more numerous dark specimens, than the brood of North German butterflies produced, when their pupæ were subjected to a high temperature for some time. Out of 23 butterflies only 2 were of the *eleus* form, *i.e.* about 8 per cent.; whilst out of the 35 butterflies of the Neapolitan brood, 8 possessed decided *eleus* colouring, *i.e.* 22 per cent.; and it must also be taken into consideration, that the latter passed their pupal existence at an ordinary room temperature, but the former at a higher temperature. There can be no other explanation, than that of the greater hereditary tendency towards black colouring of the Neapolitan brood, and the far slighter tendency thereto of the German brood.

As the direct darkening influence of heat is undeniable, so the idea is suggested, that the greater tendency of the Neapolitan brood towards blackness depends upon a permanent alteration of the germ-plasm by the heat working afresh each summer, the lesser tendency towards blackness of the German brood, on the lower summer temperature operating on numerous generations in the course of time. This is in no way a case of the inheritance of acquired characters, at least, there is no necessity, to so regard it. We need not imagine, that the black colouring of the wings produced by summer heat has been transferred from the wings through the body to the reproductive cells of the insects in question, an idea which can scarcely be thought of; but we may assume, that the heat affected at the same time the rudiments of the wings (Flügelanlagen) in the pupa and the germ in its reproductive cells, and that in both elements were contained, which were altered thereby in a similar way.

It appears to me, that this case favours to no small extent the assumption made by me, according to which the germ contains preformed determining factors (Bestimmungsstücke) of the individual elements, which later on compose the body—"determinants." On this supposition the behaviour of *phlœas* is explained simply, as I have already shown elsewhere. These determinants, which determine the various scales of the wing, are found in the germ-plasm of the reproductive cells, and in the rudiments of the wings of the pupa; and it is easy to assume, that they are struck by the heat in both places, and influenced in a similar way, though not to an equal extent. We must conclude that the intensity of the modification is unequal, from the fact, that in all the known southern colonies of *eleus* the spring form is still red-gold. The effect on the scale-determinants in question of the germ-plasm must consequently be a very slow one, and the modification, which is induced by heat is not such a one, as leads under every condition to the formation of black scales, but only of such a kind, that the formation of black scales takes place more readily, and also, indeed, at a lesser heat. In this way it can be understood, that red-gold *phlœas* still, indeed, fly in the Neapolitan spring, but that although, at a lesser heat (the room temperature of the German summer), many specimens of *eleus* arise from pupæ of Neapolitan origin.

D. *Comparison of the results obtained with those of Merrifield.*

The excellent English entomologist, F. Merrifield,* has made a series of experiments with *Chrysophanus phlœas*, which I will recapitulate here. They are in a gratifying agreement with my own.

Females of *phlœas* captured in England laid eggs, from which 70 pupæ were reared. One portion of these were kept at from 27–30° C., and produced specimens with large black spots, and in most cases with a slight black powdering of the fore wings; the red band of the hind wings was narrow and strongly dentate. The other portion of the pupæ was placed on ice, *i. e.* kept for 10 weeks at 4° C., then for 5 weeks at 13° C. Half of the butterflies were crippled or died before emergence, but those which emerged were of a bright golden yellow colour, with small black spots and a broad red band on the hind wings, from which red lines are often continued even up the veins (just as with some of my iced Neapolitan specimens).

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* F. Merrifield ("The Effects of Temperature in the Pupal Stage on the Colouring of *Pieris napi*, *Vanessa atalanta*, *Chrysophanus phlœas*, &c.") in Trans. Ent. Soc. Lond. 1893, p. 55.

If these results are compared with mine, there can be no doubt, but that the golden ground colour and the black are actually in direct dependence on the height of the temperature, which operates during the pupal period.

The last experiment of Merrifield's especially appeared very interesting to me, in which he first kept a portion of his pupæ for 10 weeks on ice, and then brought them into 30° C., when these pupæ produced, after 5-6 days, butterflies of the summer form, with black powdering and the narrow copper band of the hind wings. It follows from this that *the last days only of the pupal period* are decisive for these differences in colour, and that neither the larval nor the whole of the first pupal period comes into consideration. It could also be concluded from my second experiment, that the temperature of the larval period had no influence, as in this the larvæ were kept at the same temperature, and yet produced very different butterflies, according to whether the pupæ were subjected to cold or heat. But the fact, that the temperature first produces these differences in colour in the last 5–6 days of the pupal development, confirms the conclusion already drawn at the beginning, that it is not here a question of the suppression of one of two different schemes of development (Entwicklungsanlagen), but of a modification of the chemical processes in the colour formation of the scale. But if it is certain, that a high temperature produces darkening, and moderate cold a brightening, of the colour, still we have not yet exhausted the whole process in this; but it must be acknowledged that local races exist, which react more strongly or less strongly to the influence of cold or heat, and these local races correspond in their manner of reaction to the climate, in which they live, *i. e.* the races of warm climates are more readily accessible to the influence of heat, than those of cold climates. This appears to follow from my experiments, although, indeed, doubt might be raised, as each of the experiments was made only once; and it must be admitted, that it is impossible in experiments to entirely hit off the natural conditions of the insects, which develop in the open. The change of the day and night temperature also cannot be accurately produced, nor yet the degree of the humidity of the air in the open; it would consequently be conceivable, in the abstract, that, if everything was closely imitated, just as dark an *eleus* butterfly might arise from any German or even polar pupa of *phlœas*, as from a Neapolitan one. The results of my experiment B contradict, however, this suspicion, as they show that the Neapolitan pupæ produced some well-blackened *eleus* at the ordinary room temperature in Germany, and many specimens, which are, indeed, red, but which are all provided with deeper black and larger black spots, than the German *phlœas* exhibit as a rule. Also the Neapolitan pupa, kept on ice, produced, indeed, specimens which, in the small size of the black spots, closely approached the Lapland specimens, but yet, on the other hand, exhibited a much darker black in the marginal band, and especially often a broad black costa, such as is present neither in these, nor in German specimens.

I have already shortly given my explanation of this variability of the hereditary predisposition in southern and northern colonies of *phlœas*, and I have stated it more exhaustively in my book, 'Das Keimplasma, eine Vererbungstheorie."*

(To be continued.)

ON THE SYNONYMY OF THE BRITISH BEE HAWK-MOTHS.

By W. F. Kirby, F.L.S., F.E.S.
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The synonymy of these species has always been somewhat uncertain; and I therefore, at Mr. South's request, give a short exposition of that adopted in my 'Catalogue of Lepidoptera-Heterocera,' vol. i.

In Linné's 'Systema Naturæ,' ed. x. (1758), four species are enumerated, which we have to consider:—

(1) *Sphinx porcellus*, p. 492, n. 16. There has never been any dispute about this insect.

(2) *S. tityus*, p. 493, n. 24. "S. abdomine barbato, cingulo nigro. M. L. V. Habitat in calidis regionibus. Alarum margo niger est." The letters "M. L. V." indicate that there were specimens in the collection of Queen Louisa Ulrica; but the species is not mentioned in Linné's subsequent work on this collection.

(3) *S. bombyliformis*, p. 493, n. 27. "S. abdomine barbato coccineo, alis hyalinis luteo variis; posticis margine albis. Habitat in Europa."

(4) *S. fuciformis*, p. 493, n. 28. "S. abdomine barbato nigro; fascia flavescente, alis hyalinis margine nigro. Bradl. Nat. 26, f. 1, B. Rœs. ins. app. 231, t. 38. Habitat in Europa."

Respecting *S. bombyliformis* it is only necessary to say that in the 12th edition of Linné's 'Systema Naturæ' (1767) it is sunk as "*S. porcellus β.*," and it appears to have been only a rubbed specimen of that insect.

The difficult point relates to *S. fuciformis*, but the figures quoted all indubitably represent the *broad-bordered* bee hawk, as is proved by the dark mark at the end of the cell of the fore wings.

In the 'Fauna Suecica,' ed. 2, p. 289, Linné cites only Rœsel, but adds to his former diagnosis: "Habitat in *Lonicera*"

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* Jena, 1892, p. 523.

[*broad-bordered*]. "Descr. Magnitudo Bombylii. *Corpus* griseum. *Abdomen* cingulo nigro; barba laterali pone cingulum albida. *Anus* barba nigra. *Antennæ* nigræ."

This complicates matters, for the character, "Abdomen cingulo *nigro*," applies better to the narrow-bordered (scabious) species than to the broad-bordered (honeysuckle) species, in which the belt is dark reddish rather than black.

In the 12th edition of the 'Systema Naturæ' (1767), pp. 803, 804, Linné slightly modifies his description: "S. abdomine barbato nigro; fascia flavescente alis fenestratis margine nigro atro-purpurascente." He gives a long string of references, which we need not quote, and adds: "β. *Sphinx tityus* abdomine barbato cingulo nigro. Syst. Nat. 10, p. 493, n. 24. Habitat in *Lonicera*. Barba abdominis in medio alba est." We may disregard the last two sentences, for, according to Linné's method, they would be intended to apply to the species as a whole, and not specially to "β."

Hence we may conclude: (1) the type of Linné's species was the broad-bordered species, feeding on *Lonicera*. (2) In his 'Fauna Suecica' he mixed it up with specimens of his *S. tityus*, and added a character properly applicable to the latter. (3) In the 12th edition of the 'Systema,' Linné, discovering that he had mixed two forms, separated the second as "β," distinguishing it by the very character which, from those given, would at once separate his *Sphinx tityus* as the narrow-bordered bee hawk, feeding on scabious.

Hence, I take it, the name *bombyliformis* should disappear from our lists altogether, except as a synonym, primarily of *porcellus* and secondarily of the bee hawks, which should stand as *Hemaris fuciformis*, Linn. (broad), and *Hemaris tityus*, Linn. (narrow), respectively.

For the bee hawk-moths I prefer to use the generic name *Hemaris*, Dalman, Vet. Akad. Handl. 1816, p. 207, with the broad-bordered species as the type, regarding *Sesia* as more correctly applicable to the smaller clear-wings.

It is hardly worth while discussing the post-Linnean synonymy, as, even if *bombyliformis* was an allowable name for either species, it would become a mere synonym of one or the other.

THE NOMENCLATURE OF THE "BEE HAWK-MOTHS."

By Louis B. Prout, F.E.S.

Twice within the last few months my attention has been called to the confusion which results from the fact that both the names *fuciformis* and *bombyliformis* have been by different authors applied to each of our species of "bee-hawk"; and I find that the manner of employment of the names in our standard reference list ('The Entomologist Synonymic List') is not understood by all working entomologists. Unfortunately the change from the Doubleday nomenclature has not been noted in the published list of alterations. I therefore venture to submit the following summary for the assistance of readers of the 'Entomologist':—

Fuciformis, Linn. (*teste* Ochs.) = *fuciformis*. South's List = *bombyliformis*. Auct. Brit. = the "narrow-bordered," or scabious species.

Bombyliformis, Ochs. = *bombyliformis*. South's List = *fuciformis*. Auct. Brit. = the "broad-bordered," or honeysuckle species.

Zeller, in discussing this complication (Stett. Ent. Zeit., 1869, p. 387), suggested that the only solution of the difficulty would be to abandon the old names, and call the two species, for example, *scabiosæ* and *loniceræ*. But it appears to me that enough would be done, without doing violence to the recognized laws of nomenclature, if any one had the pluck to alter *one* of the names, thus:—

If *fuciformis*, L., be, as Zeller unhesitatingly affirms, the scabious species, that name stands, as in South's list.

But *bombyliformis*, Linn., is now universally rejected as doubtful. Therefore we have only to apply the very sensible rule, advocated by Mr. Kirby and other leading synonymists, that a rejected name is not again available in the same genus, and to rename the honeysuckle species, instead of calling it "*bombyliformis*, Ochs." And there could be no confusion between the two species "*fuciformis*" and "*loniceræ*," however unfamiliar the application of the former name to the scabious species might appear.

That we are dealing with a really practical question, and not only with one of intricate synonymy, was brought home to me by the two facts to which I referred at the commencement of this note. As a faunistic note, Mr. Rhoades Smith's record of *fuciformis* for Middlesex (Entom. xxviii. 233) is rendered unintelligible by the said confusion. I have it, on the authority of Mr. Percy Smith, that the insect in question was the *narrow-border*, its captor basing his nomenclature on Kirby's 'European Butterflies and Moths.' And from a collector's point of view it is provoking to meet with the experience that befel one of my friends, who received from a well-known entomologist specimens of the *broad-border* (which he did not want), having had them offered to him by the correct name of *bombyliformis*, but having construed that into an offer of the *narrow-border*, according to the usage of the older British authors.

12, Greenwood Road, Dalston, N.E., Jan. 3rd, 1896.

SENSES OF INSECTS.

By G. A. K. Marshall, F.Z.S., F.E.S.

I have read with much interest the discussion lately carried on by Mr. Watson and Mr. J. Arkle on the above subject (Entom. xxviii. 30, 243). But the article of the latter gentleman calls, I think, for some remark; for with regard to several subjects dealt with therein he takes up a position which seems to me to be wholly untenable.

The writer would appear to have a grievance against entomologists in general for their laudable efforts to explain the reason of and uses for the large variety of sounds produced by the insect world; and although he is content to summarily dismiss the "stories of scientific observations" in a short and somewhat contemptuous passage, which casts a decided slur on those who made the observations, yet I notice that he offers no adequate theory or explanation to take the place of that which has fallen a victim to his iconoclastic efforts. He approaches the whole subject in a distinctly biassed and anti-scientific mood, the key-note of which is struck in the following passage:—"Nature has landscape sounds for our ears, just as she provides scents for the smell or colours for the eye." The idea which underlies that theory of the old naturalists, that fossils were only put into the rocks for the amusement and delectation of mankind, is dying harder than I thought. It would be quite foreign to my present purpose to try and combat that idea, and I will merely observe that the explanation given for the occurrence of unpleasant sounds and smells, *viz.*, that they prevent monotony, has certainly the merit of quaintness if nothing else, though I fear it would hardly stand investigation.

But, leaving the subject of general principles, I have other "bones to pick" with Mr. Arkle. He says that "sensitiveness to concussion or vibration is an entirely different thing from hearing." This I certainly cannot agree with, and it looks to me very much like a case of *petitio principii.* With all due deference I would suggest that hearing is merely a localised and highly specialised sensitiveness to vibration. In other words, that the auditory apparatus is an organ specially adapted for receiving and recording those vibrations of the air, known as sound waves, which are too delicate to be felt by the other ordinarily sensitive portions of the body. Indeed I should consider that the difference between the sense of hearing and that of touch is only one of degree and not of kind. There is little doubt that such auditory powers as are possessed by insects are of a very different character from those possessed by man, as they are not nearly so highly specialised or differentiated, and it is extremely probable that they are in many instances nearly allied to, or even combined with, the faculties of touch. I quite fail to understand Mr. Arkle's strong desire to deny the power of hearing to all insects—a power which, from its great utility for protective purposes, one would expect to find even low down in the scale of living creatures, and which would be rapidly developed by natural selection, whenever any variation in that direction might afford it a basis to work on. Even when for a moment he does grudgingly allow that perhaps some insects may possess this faculty, he hastens to assure us that it is "most rudimentary," and "serves no purpose as a warning and protection." Now to my mind the existence of rudimentary hearing faculties, which are entirely useless, is an anomaly calling for an immediate explanation, with which Mr. Arkle does not seem prepared to favour us; though I must remark that their inutility is a purely arbitrary assumption. The occurrence of such rudiments, if rudiments they be, can only be accounted for in two ways, *viz.*:—(*a*) that they are the result of atrophy or degeneration—this explanation would point either to a wholesale degradation of insects which is not borne out by the facts, or to the assumption that a more specialised form of auditory apparatus exists or has existed even lower in the scale of nature, which I presume the writer would not be prepared to admit; (*b*) that they are the result of improvement and development, being the earlier links in that long chain which culminates in the complicated ear of the higher vertebrates, and in that case it is evident that they must come within the scope of, or rather owe their very existence to, natural selection. This appears to me to be the true explanation. But one of the first principles of that far-reaching law is that it can develop only such characters as are actually useful. But Mr. Arkle asserts that these rudiments are absolutely useless, which is absurd, as our friend Euclid remarks. I certainly cannot see why anyone should jump to the conclusion that any hearing powers which insects may possess must necessarily be far inferior to those of man, for in the case of two senses at all events they have a decided advantage over us. The human nose would be quite incapable of such feats as are daily performed by coprophilous beetles or the males of "assembling" moths, and the tactile powers in the body of a caterpillar or the antennæ of many insects are far more sensitive and delicate than anything we possess.

I have lately had good opportunities of observing the habits of a family of insects which numbers among its ranks some of the greatest noise-producers of the whole class; I mean the Cicadas. I have so far found some nine species of these curious and interesting Homopterans in this immediate neighbourhood, and every day as soon as the sun gets hot the bush resounds far and wide with their ear-splitting sounds, which are certainly more vigorous than pleasing. Now, as is well known, these vocal powers, if I may call them so, are confined to the males, which of itself is a highly significant fact, and, apart from all other considerations, lends a distinct air of probability (to put it no stronger) to the theories of those who believe in the auscultory powers of insects. Mr. Arkle quite rightly argues that the possession of a sound-producing apparatus is no *proof* of the ability to hear. Yet I maintain that it is strong *primâ facie* evidence in favour of that ability; and when such apparatus is confined to one sex the evidence becomes so strong as to fully justify the assumption of hearing powers, at all events in the opposite sex. Moreover, when we come to examine the male cicada and see what a large portion of its economy is occupied by the sound-producing organs, the mind of any man who has read with ordinary intelligence the works of such authors as Darwin, Huxley, or Wallace, must revolt from any theory which would explain away this mechanism as being merely adventitious, or else supplied by the kindness of Nature for the delectation of the Kafirs in the wilds of Africa, and to prevent their being annoyed by the monotony of pleasanter sounds. Such a highly specialised apparatus must be of immense importance in the welfare of the insect in which it occurs, and can only have been produced by some very potent factor, which, as I will show hereafter, I believe to have been natural selection acting on the basis of the reproductive instinct, a most powerful combination. We have already seen that sounds are emitted only by the male sex, and therefore if it can be shown that the female seeks the male, instead of *vice versâ*, I think it will be admitted that we have very strong circumstantial evidence, amounting practically to proof, that the female can hear and is attracted by the song of the male. Now, although I am aware that by doing so I lay myself open to "the suspicion that science may end and enthusiasm begin," I must state that such observations as I have made have undoubtedly pointed to the fact that the female does seek the male. My notes have been made on only two species, which offer greater facilities for observation than the others. For it is not always easy to make accurate observations on these insects owing to the difficulty of detecting them, the sluggishness of their movements, the height at which they usually sit, and especially to the fact that the male and female are indistinguishable on the tree, unless the former happens to be singing, when the abdomen is slightly raised and the wings held at a somewhat acute angle. I have frequently watched solitary males when singing, and seen another cicada advance from some other part of the bough or trunk with its slow somewhat jerky gait, stopping every few seconds, and even passing and repassing the calling insect, until at last it comes to a rest alongside of him. On netting such insects I have invariably found them to be females, and on one occasion I took three which had gathered round a single male. I have noticed that when there are any impassive females in the near vicinity of calling males these latter after a time become restless, walking backwards, forwards, and sideways, singing all the time, and occasionally giving a sharp flutter with their wings, as if to try and attract the attention of the females. This always reminds me of the "showing off" of many male birds. That these performances are intended for the female is well illustrated by an instance I saw only yesterday. A male cicada was singing on a small branch, and on another parallel branch, about six inches away, was a female. When I first observed him the former was sitting quite still, but he gradually worked himself up, and began walking up and down and all round his branch, occasionally giving a sharp flutter with his wings; but the female remained quite impassive. He got so excited that on three occasions he even took short flights of a few feet from his branch. I watched with interest to see if he would settle on the other one. But no; in each case he returned to his own and recommenced his serenading, which seemed to me significant. The female eventually got tired of him and adjourned to a neighbouring tree; whereupon he became quiescent, though he still continued calling.

Moreover, there is another fact which throws a very interesting side light on the matter. As I have before mentioned, I know of nine different species round here; and although there is a general similarity in the sounds which they produce, yet the differences between them are sufficient to enable me, with a little practice, to identify the species merely by hearing its cry. Why, then, should there be such a diversity of sounds if they are to serve no purpose? If, however, we acknowledge that the male utters his shrill cry for the purpose of attracting the female, the explanation of these distinctions at once becomes evident. For it is manifest that if the female finds the male by his call, and there is a number of different species frequenting the same area, those males which acquire some peculiarly distinctive sound would be likely to attract to themselves more females of their own kind, and thereby would leave more progeny, than those males whose cry more closely resembles that of another species; for these latter would be apt to attract females of the other species with which they could not interbreed. And, *pari passu*, those females which are most adept at distinguishing the notes of their own males from those of other species, are more likely to pair and leave progeny. It is instructive to note, in this connection, that the differences in the cries of two species vary in accordance with their relationship; the more nearly allied species possessing more similar calls.

Although I have several times imprisoned male cicadas in gauze-covered boxes, to see whether they would attract females by calling, unfortunately my experiments have failed so far, owing to the fact that the male has always refused to utter a sound beyond an occasional indignant squeak, quite distinct from his usual call. One day I came across a most unusual concourse of one species, there being about sixty specimens on a single small bush. With one sweep of the net I caught two males and five females, and I then stood for a few seconds watching where the remainder were settling. Meanwhile the two males in my net were screeching vigorously, and I noticed two cicadas fly round successively and settle momentarily on the net. These I marked down, and on capturing them found them to be both females. If this be taken as an instance of the female flying direct to the call of the male, it is the only one that has come under my notice. Cicadas, however, do not seem to indulge much in flight, and considering the numbers there must be about, I have seen very few on the wing, except when they have been actually disturbed. Their sluggishness may perhaps be accounted for by the fact that these insects are perfectly defenceless, their only protection being their excellently protective colouring; and therefore their greatest safety lies in sitting still. This is a most important fact, which has been quite overlooked by Mr. Arkle in his supposititious case of *Melanippe fluctuata* remaining undisturbed by a military band, and one which often renders it very difficult to decide the true effect of sound, &c., on an insect. The fact that the moth was not disturbed by the music is no more a proof of its deafness than the fact that it did not fly away at the sight of the approaching stick (but waited to be touched) is a proof that it could not see. The great majority of unarmed insects, which are well adapted to their surroundings, sit fairly close. This is the case with the cicadas; several species allowing the branch on which they are sitting to be roughly shaken, or even struck sharply with a stick within a few inches of themselves, without moving; and yet this is no proof that they have no sense of touch. For such insects immobility is their safest course, up to a certain point.

I have so far dealt only with insects which possess a distinct sound-producing apparatus. I will therefore now take an example from those which are without such adjuncts. While strolling in the bush round my camp after dark with a lantern, in search of those giant Carabidæ, *Tefflus* and *Anthia*, I have often been attracted by a sharp pattering sound among the heaps of dead leaves. On inspection this proves to emanate from a small blackish termite. A closer investigation shows that the sound is produced by the large-headed soldiers only, which are walking about among the leaves in front of the workers, while the latter are busy building their little mud tunnels. The method in which they produce the sound is by raising themselves on their legs, and then, with a very rapid motion, striking the leaf two or three times with their heads. Now the naturalist who is worthy of the name requires some reasonable explanation for all such facts he may observe. Why do the soldiers stand in front, often exposing themselves on the tops of the leaves? and why do they strike their heads thus on being approached? Obviously they are there to guard the defenceless workers with their well-developed jaws, and to give warning, by rapping, of impending dangers; the truth of which latter conclusion is demonstrated by the fact that, if the disturbing element continues, the rapping will after a time grow less, until it will be found that all the termites have retired underground. If this be so, it is evident that the striking must be perceived by the workers in some way. Personally, I think they hear it, though this is almost impossible to prove; for I can no more believe that they perceive it by the sense of touch, as we understand it, than that a man can perceive the striking of distant horse-hoofs by means of his hands rather than his ears. The soldiers, however, do not stand on such debateable ground, as they are able to give some evidence of their perceptions. It must be remembered that they are blind, and now Mr. Arkle asserts them to be deaf, thus leaving them only the senses of touch and smell wherewith to perceive the approach of their enemies. This seems to be improbable on the face of it, and I have had abundant proof that it is not the case. When the footstep of the observer falls within a certain distance of the termites, the little army becomes much perturbed, and the warning rap is energetically repeated every few seconds. If there be a fairly long row of them at work, the rap may be distinctly heard to travel along the line from its starting-point. However, unless again disturbed, they will soon quiet down. Then if the hands be clapped, the fingers snapped, a dry stick cracked, or any other similar sound made within a foot or two of the insects, the sentinels will give a sharp rap after each noise. Now I have made these experiments very many times, and always with the same result; therefore this cannot be regarded as a mere coincidence. It may then be granted that the insects are affected by and can perceive these sounds; in which case they must be able to hear, as that is the only sense by which they could perceive them. The sound that I have found to elicit the most prompt and energetic reply is a sharp whistle, care of course being taken to prevent the breath reaching the termites. I have known them to hear such a whistle at a distance of even six feet, which, if proportionate size be taken as a standard, would mean about half a mile in man. This example is, I think, sufficient to show the fallacy of Mr. Arkle's assertion that any hearing powers insects may possess are rudimentary, and of no use for warning purposes.

But since it has been shown that the cicada, with a complicated sound-producing organ, and the termite with none, are both equally capable of hearing, we have good reason for assuming that insects in general are possessed of the same power, and especially those that are themselves able to produce sound.

With regard to the more speculative issue, as to whether insects possess some additional sense which we have not, Mr. Arkle says that if they have such a sense it is obviously one of direction. In the first place, the obviousness is by no means apparent to me; and, secondly, as we do possess a sense of direction, it hardly seems to come within the scope of the argument. As, however, the evidence of so great an authority as Sir J. Lubbock has been adduced to demolish this "obvious" conclusion, I cannot refrain from making a further reference to it. Many insects, such as bees, ants, &c., possess a definite and fixed abode, from which they are in the habit of wandering, sometimes for considerable distances, in search of food. Now, if these insects have no sense of direction whatever, how can they find their way back as accurately as they do? To fall back on the old resource and explain it by instinct is merely a plausible way of saying, "I don't know." I cannot see that there is any inherent impossibility for insects to possess an additional sense. For instance, there is a vast gap between the number of vibrations in the quickest sound-wave and that of the slowest light-wave; and yet we are quite unable to appreciate or perceive the intermediate vibrations. It is, however, quite possible that such differently constituted creatures as insects might be able to do so, and thus possess a sense that man has not. Indeed, Sir J. Lubbock has shown that ants are sensitive to the ultra violet rays of light, and can probably see them. But without going so far afield, I think many insects have demonstrable senses for which we have no exact parallel. I need only adduce one instance. It is well known that the vast majority of termites have no eyes; and yet any one who has observed them will have noticed how readily they can perceive light, for which they show a strong dislike. What then is the name of the sense which enables them to do this? It cannot be sight, for they are blind. Neither can it be any of the other four senses, as we understand them, for to our ideas light has no smell or taste, and is inaudible and intangible. I must therefore leave the solution of the problem to a wiser head than mine.

Lower Umfuli River, Mashunaland.
October, 1895.

ENTOMOLOGY IN OCTOBER.

By C. W. Dale, F.E.S.

Notwithstanding the chilly winds and rains and occasional frosts which herald the approach of winter, October is, to my mind, after May and June, the best Entomological month of the year. But it is by real hard work that good insects are to be obtained; it is certainly no light task beating a lot of thatch and ivy and apple trees, and pulling moss and rubbish to pieces. It is certainly the best month in the year for three genera—*Depressaria*, *Platypeza*, and *Aleyrodes*. Besides the beautiful species of the hybernating genus *Vanessa*, the last broods of the following butterflies appear: *Pieris rapæ*, *Chrysophanus phlœas*, *Pararge egeria*, and *P. megæra*. To prevent this paper from being too ong, I will mention only those species taken by myself at Glanvilles Wootton. To begin with: by beating thatch I have obtained *Xylina petrificata*, *Theristis caudella* (*mucronella*), *Cerostoma radiatella* and *costella*, *Acrolepia pygmæana*, *Laverna decorella*, *epilobiella*, and *atra*, *Chauliodus chærophyllellus*, *Lyonetia clerkella*, *Gelechia lyellella*, *Depressaria pallorella*, *alstrœmeriana*, *purpurea*, *capreolella*, *propinquella*, *subpropinquella*, *rhodochrella*, *arenella*, *atomella*, *applana*, *yeatiana*, *ocellana*, *ciliella*, *granulosella*, (*zephyrella*), *albipunctella*, *discipunctella*, *weirella*, *chærophylli*, *ultimella*, *badiella*, *nervosa*, and *heracleana*, *Psoricoptera gibbosella*, *Simæthis pariana*, and various species of *Bracon*, *Crytophagus*, *Asteia*, *Musca*, *Mycetophila*, *Culex*, &c.

By beating ivy I have obtained *Cerastis vaccinii* and *spadicea*, *Scopelosoma satellitia*, *Miselia oxyacanthæ*, *Orthosia lota*, *O. macilenta*, *Agriopis aprilina*, *Agrotis segetum*, *A. suffusa*, *Hadena protea*, *Anchocelis lunosa*, *A. pistacina*, *Dryops femoratus*; and swarms of *Apis vespæ* and *Eristalis tenax*, *Musca rudis* and *vomitoria*, &c., in the day time. By beating apple trees in orchard I have obtained *Cidaria miata* and *C. psitticata* (*siterata*), *Sarothripus undulanus*, *Peronea cristana*, *Leptogramma literana*, *L. scabrana*, *Cerostoma radiatella*, *Gelechia lyellella*, *Gracillaria elongella*, *Coriscium sulphurellum*, *cuculipennellum*, *Lyonetia clerckella*, *Zelleria insignipennella*, and *Alucita hexadactyla*. I have followed this work till December, and have been rewarded by taking *Exapate gelatella*. In the woods *Oporabia dilutata* and *Lemnatophila phryganella* occur commonly, and five species of the rare genus *Platypeza*—*modesta*, *rufa*, *picta*, *aterrima*, and *infumata*. The genus *Aleyrodes* occurs freely during this month: *A. brassicæ*, a pest in the gardens, and *A. spirææ* in woods. The other species are *A. proletella* on celandine, *A. loniceræ* on honeysuckle, and a new species on columbine, *A. aquilegiæ*, which will be probably described by Mr. Douglas as soon as I can discover the larvæ. Other good species I have taken this month are *Embolemus ruddii* with its apterous female, *Myrmecomorphus rufescens*, *Alysia contracta*, *Proctotrupes brevipennis*, *Codeus apterogynus*, *Myrmica lippula* males and females, *Anomatus 12-striatus*, *Agathidium varians*, and *nigripenne*, *Phlœiophilus edwardsii*, *Larinus carlinæ*, *Haplocnemus femoralis*, *Tetratoma desmaresti*, *Cynips apterus*, *Borborus pedestris*, and the species of the winter genus, *Trichocera*, which may be seen all winter through, even dancing up and down when the ground is covered with snow. Another genus of the Tipulidæ is also out in force this month, *Amalopis straminea* and *immaculata* occurring here, and three other species in Devonshire. *Tipula pagana*, *confusa*, and *signata* also are on the wing, as well as the last representative of the Trichoptera, *Phacopteryx tuberculosa* (*villosa*), which continues till December. I might considerably add to this list, but think I have named enough to show that collecting in October is not to be despised.

October 27th, 1895.

ON THE ABUNDANCE OF ORTHOPTERA IN THE ALPS.

By W. Harcourt-Bath.

Next to the Rhopalocera, the Orthoptera are undoubtedly the group of insects which are mostly in evidence in the Alps. If they do not display their figures in such an ostentatious way as the frivolous butterflies, they fully make up for that trait by reason of the great noise they create. If they also lack the beautiful colours of their more handsome relations, they adequately compensate for any deficiency in this respect on account of the grotesque forms they frequently assume.

The grasshoppers belonging to the two families Acridiidæ and Locustidæ certainly constitute some of the most characteristic insect inhabitants of the Alps. They occur by far the most plentifully in the lower valleys of the mountains, especially upon their sunny southern slopes, and rapidly become more scarce the higher one ascends, until at about 9000 ft. above the sea-level they disappear altogether. They commence to make their appearance in the perfect state about the beginning of June in the warmest localities and at the lowest elevations, emerging later and later according to the altitude. August and September are the two best months for collecting them, as they are then in their greatest abundance everywhere.

The noise they produce is sometimes deafening and perfectly bewildering. I have heard their stridulations on many occasions when travelling at full speed in a fast train; and sometimes, when traversing grassy or bushy tracts wherein they abounded, it was necessary to speak in a loud tone to a companion only a few yards away to make him understand what I had to say.

The most plentiful species is undoubtedly the great green grasshopper (*Locusta viridissima*), which I have often heard stridulating in thousands on a warm evening. It is a fine sight to see this conspicuous insect flying in the bright sunshine like a large migratory locust, a habit I have never observed in our own country.

The more robustly-built *Decticus verrucivorus* I have also encountered in abundance in many localities, especially in the Rhone Valley and near Interlaken. As is well known, this insect is employed by the peasants for charming away their warts. Another large species I met with last year on the south side of the Gemmi Pass near Inden. Its stridulations possess a wonderful resemblance to the hiss of a snake, which mimetic habit no doubt serves to protect the insect from the attacks of batrachian reptiles and insectivorous birds. It is of a purplish colour, prettily striped with yellow and brown. This insect belongs to the Acridiidæ, a different family to the two preceding.

The beautiful butterfly locust, *Œdipoda cærulescens*, occurs in considerable abundance in many localities in the Alps, particularly on the limestone formation. On the south side of the Brünig Pass, in September, 1894, I encountered it in great numbers. As a rule it sits at rest on rocks and stones which exactly resemble it in colour, so that when it remains motionless it can with difficulty be detected, but when approached it invariably flies away, looking remarkably like a bright-coloured butterfly. The tegmina of this species are brown of various shades, sometimes inclining to grey; but the under wings are beautifully adorned with rich crimson, being bordered on the margins with black. A common variety has the crimson space occupied by a deep azure blue. This is another representative of the Acridiidæ, which also possesses many other members, but of an average smaller size; about the dimensions of our own field grasshoppers.

One of the most beautiful species of the Locustidæ I have met with is an apple-green form, of exceedingly slender shape, something like *Locusta viridissima* in appearance. I have seen specimens of it at Interlaken, at the base of the Rothhorn, sitting on the heads of various Umbelliferæ, no doubt waiting for the approach of smaller insects which constitute its prey.

Crickets, belonging to the family Gryllidæ, of several species occur, the commonest of which is the field-cricket (*Gryllus campestris*), which I have seen and heard in many localities. On the road between Spiez and Reichenbach I heard them stridulating in thousands in the meadows one day in July after a brief thunderstorm, the moisture produced by which they seemed to enjoy, judging by the noise they created.

These insects sit at the mouths of their holes, stridulating until the intruder approaches within a yard or so, when they suspend their orchestral performances and disappear two or three inches down their dwelling; but they can be frequently induced to show themselves again by injecting a blade of grass, which they seize in rage, and can thus be secured. On the Brünig Pass, one sultry afternoon in September, I saw several specimens running about on a bank, possibly in the act of migrating for the purpose of forming new colonies.

I have not hitherto studied or collected the continental Orthoptera, although upon the occasion of several trips across the Channel I have been strongly tempted to do so. As I contemplate undertaking an extended tour in the Alps this season, I may find an opportunity of forming a collection. For several years past I have been considerably interested in the British species of this order.

Birmingham, January 5th, 1896.

A NEW SCALE-INSECT INFESTING DATE-PALMS.

By T. D. A. Cockerell, N. M. Agr. Exp. Station.

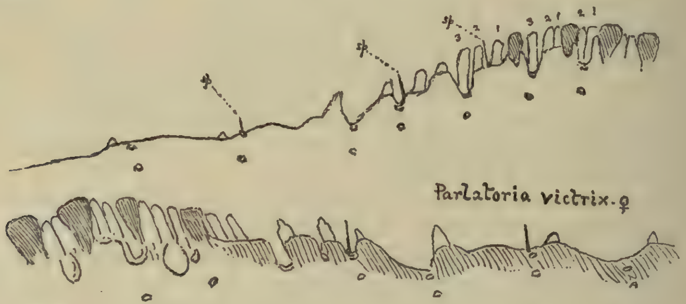
Parlatoria victrix, sp. nov.

♀. Scale about 1½ mm. long, similar to *P. zizyphus* (which I find on lemons), but the true scale white (in *zizyphus* it is brownish); second skin black, bordered with pale ochreous (in *zizyphus* it is all black); first skin narrower, often pale greenish, and not so much overlapping second skin.

♂. Scale white.

♀. (Boiled in potash) nearly colourless, tinged with brown. No grouped ventral glands. Three pairs of lobes; median four rather close and equidistant from one another, the third lobes more distant from the second. Lobes having about the shape of an axe-blade, narrowest at base. Plates scale-like. Margin striate. Mouth-parts far posterior.

For the arrangement of the spines, plates, and lobes, see the figures.



Hab. On leaves of date-palm, sent from Tucson, Arizona, by Prof. Toumey. Writing Dec. 28th, 1893, Prof. Toumey says:—"I send you to-day specimens of date-palm (*Phœnix dactylifera*) infested with sp. of *Parlatoria*. . . . I believe this scale was brought here on trees imported from Africa, and distributed by Department of Agriculture."

These palms were originally from Cairo, so the insect is probably Egyptian. It is curious that it has never been noticed by European naturalists; the *Aronidia blanchardi*, lately described by Targioni-Tozzetti, from date-palms in the Sahara, is evidently a different thing.

The insect was formerly considered to be *Parlatoria zizyphus*, but on comparing it with true *P. zizyphus* (found on lemons) it is evidently distinct. Mr. Pergande, of the Entomological Division at Washington, has re-examined it from material I sent, and is now also of this opinion.

Las Cruces, New Mexico, U.S.A.
Feb. 5th, 1895.

LEPIDOPTERA AT LIGHT AT IPSWICH.

By Claude A. Pyett.

A review of the past season, through the means of a carefully kept diary, shows that it has been exceptionally productive of Lepidoptera, especially as regards collecting at light. The year has been remarkable from the fact that usually common species, such as *Mamestra brassicæ* and *Rumia luteolata*, have been scarce, and in some instances, for example *Agrotis segetum*, I have not seen a single specimen. *Melanippe fluctuata* was the only insect that maintained its proverbial frequency in these parts; *Noctua c-nigrum*, which I referred to last year as a pest, being comparatively uncommon. A few species occurred plentifully, *M. persicariæ* being the most conspicuous.

That the season has been successful is proved by my having taken no fewer than 199 species, made up as follows: Diurni, 1; Sphinges, 3; Nocturni, 11; Drepanulidæ, 2; Pseudo-Bombyces, 6; Noctuæ, 66; Geometræ, 62; and Micros, 48. Dealing with the latter separately, *Pionea forficalis*, *Crambus hortuellus*, and *C. tristellus* swarmed, but with these exceptions none of the others abounded. On the whole, the best Macro taken for the county is *Leucania phragmitidis*, of which I took two specimens in one night with *Dianthœcia carpophaga*, likewise an apparently scarce insect in this locality. Among the Micros, *Spilonota roborana* and *Ephestia ? passulella* are new to the Suffolk list, whilst I have to record the capture of *Tinea pallescentella* for the first time this year in the county. Several specimens of *Dicranura bifida* and *Smerinthus ocellatus* occurred; of the former I took four. One *Amphidasys betularia* of the true var. *doubledayaria* form fell to my lot.

The autumn season was a decided contrast to 1894, insects being noticeably scarce, although the weather was not unfavourable. Of the few species recorded, *Xanthia gilvago* was present in unusual numbers, also *Eugonia fuscantaria*, but I only secured one *E. alniaria* (*tiliaria*), the commonest of the 1894 "thorns." It is remarkable, bearing in mind the central situation of the two electric arc lamps in the town, that this illuminant should be occasionally visited by such insects as *Hepialus humuli* and *Acentropus niveus*. An Ipswich entomologist, in the November issue (Entom. xxviii. 314), comments on the superiority of the electric light over gas as a means of attracting insects, but my experience has been the reverse. To bear this out, it would have been interesting to tabulate the insects taken respectively at the two sources of light; but as this would occupy so great space, I have instead carefully summarised the relative differences. Thus, of Lepidoptera taken, 66 species occurred at both illuminants, whilst 81 were captured through the medium of lamps, and 52 only at electric light. The introduction of the brilliant incandescent gaslight dates only towards the end of September, otherwise this might be thought attributable, although, apart from this, there is every reason to suppose that its adoption will tend to diminish the visitants to the arc lamps, as will be seen by reference to the closing months of the year in the following list, in which I have specified under each month the captures at each light, it being understood that in those cases where not otherwise stated the insects were taken at both.

February.—*Hyberia rupicapraria.*

March.—*Phigalia pedaria, H. progemmaria, Anisopteryx æscularia.*

April.—*Tæniocampa instabilis, T. stabilis, Selenia bilunaria, Biston hirtaria, Amphidasys strataria, Hemerophila abruptaria, Eupithecia vulgata, E. abbreviata, Melanippe fluctuata.* Lamps only: *Xylocampa areola.* Electric light: *T. cruda, Diurnea fagella.*

May.—*Arctia lubricipeda, A. menthastri, Acronycta psi, M. brassicæ, Apamea basilinea, Grammesia trilinea, Caradrina morpheus, Agrotis exclamationis, Noctua rubi, T. gothica, Hadena trifolii* (*chenopodii*), *H. oleracea, Plusia gamma, Rumia luteolata, Odontopera bidentata, Melanippe sociata, Coremia ferrugata, Pionea forficalis, Alucita hexadactyla.* Lamps: *Pieris rapæ* (to gas in church), *Smerinthus populi, Notodonta camelina, Cilix glaucata, T. gracilis, Cucullia umbratica, Eupithecia nanata, E. assimilata, Hypena rostralis, Botys urticata, Œcophora pseudo-spretella.* Electric light: *Sphinx ligustri, Smerinthus ocellatus* (several seen), *Dicranura bifida, D. vinula, N. dictæa, N. ziczac, Acronycta megacephala, H. pisi, H. adusta, Amphidasys betularia, Emmelesia affinitata.*

June.—*Bryophila perla, Leucania pallens, M. persicariæ, Miana furuncula, C. alsines, Noctua augur, Acidalia virgularia, A. aversata, Eupithecia rectangulata, E. fraxinata, Cidaria dotata, Pyralis glaucinalis, Crambus tristellus.* Lamps: *Leucania impura, Axylia putris, Apamea unanimis, Agrotis puta, A. corticea, Euplexia lucipara, Hadena thalassina, Plusia chrysitis, A. bisetata, A. trigeminata, Cabera exanthemaria, Lomaspilis marginata, E. succenturiata, Melanippe montanata, Coremia unidentaria, Herminia nemoralis* (*grisealis*), *Cataclysta lemnata, Spilodes cinctalis, Scopula olivalis, Crambus pratellus, C. perlellus, Schœnobius forficellus, Tortrix rosana, Penthina pruniana, P. cynosbana, Xanthosetia hamana, Pterophorus pentadactylus.* Electric light: *Orgyia pudibunda, Pygæra bucephala, Acronycta aceris, Noctua festiva, Uropteryx sambucata, Panagra petraria, Pyralis farinalis, Scoparia ambigualis, S. cembræ, S. mercurella, C. hortuellus, Tortrix heparana, T. ribeana, T. podana, T. viridana, Carpocapsa pomonana, Tinea pallescentella.*

July.—*Lithosia lurideola, Chelonia caia, Liparis auriflua, L. salicis, Bombyx neustria, Leucania phragmitidis, Agrotis tritici, Boarmia repandata, B. rhomboidaria, Halia wavaria, Paraponyx stratiotata.* Lamps: *Hydræcia nictitans, Xylophasia lithoxylea, Miana strigilis, M. furuncula, Cosmia trapezina, Dianthœcia carpophaga, Larentia didymata, Eupithecia oblongata, E. subfulvata, E. sobrinata, Hypsipetes elutata, Coremia quadrifasciaria, Botys ruralis, Scopula lutealis, Ephestia elutella, E. passulella ?, Aphomia sociella, Tortrix ministrana, Peronea variegana, Spilonota roborana, Tinea tapetzella.* Electric light: *Hepialis humuli, Lasiocampa quercifolia, Platypteryx falcula, X. monoglypha* (*polyodon*), *Mamestra anceps* (seen), *Triphæna pronuba, Selenia bilunaria* var. *juliaria, Acidalia scutulata, Timandra amataria, Cabera pusaria, Abraxas grossulariata, Ligdia adustata, Aglossa pingui-

nalis, Acentropus niveus, C. culmellus, Dictyopteryx bergmanniana, Hyponomeuta cagnagellus, Depressaria chærophylli, Endrosis fenestrella.

August.—*Heliophobus popularis* (several), *Luperina testacea, Agrotis nigricans, Noctua c-nigrum.* Lamps: *L. cespitis, Eugonia tiliaria, Aspilates ochrearia, Cidaria truncata, C. immanata, Anaitis plagiata.* Electric light: *Triphæna comes, T. ianthina.*

September.—*Xanthia fulvago, Polia flavicincta, Chesias spartiata, Stenopteryx noctuella.* Lamps: *Noctua xanthographa, X. gilvago, X. ferruginea, Catocala nupta, Eugonia fuscantaria, Thera variata, Cidaria miata.* Electric light: *Nonagria lutosa, Noctua glareosa.*

October.—Lamps: *Hydrœcia micacea, Anchocelis pistacina, A. litura, Miselia oxyacanthæ, Oporabia dilutata, Thera firmata* (13th!), *Eubolia cervinaria, Depressaria applana.*

November.—*Hybernia defoliaria, Cheimatobia brumata.* Lamps: *Pœcilocampa populi.* Electric light: *H. aurantiaria.* — CLAUDE A. PYETT; Ipswich, November, 1895.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

BY W. F. DE VISMES KANE, M.A., M.R.I.A., F.E.S.

(Continued from p. 19.)

HECATERA CHRYSOZONA, *Bork.*—Included in the Rev. J. Greene's list of Irish Lepidoptera, but without data given. Several, both larvæ and imagines, have been taken at Clonbrock (*R. E. D.*). Said to have been found on shores of Lough Foyle by Curzon.

HECATERA SERENA, *Fb.*—Very local, and usually scarce. Specimens with the central band broad and dark, and the white of the base and subterminal area reduced in size, occur. One var. *leuconota* at Cappagh, Co. Waterford. Portrane, somewhat abundant (*F. N.*); Howth (*B.*), Killiney (*S.*), Co. Dublin; Tinahely (*Bw.*) and Greystones, Co. Wicklow; Belfast (*Bw.*), Cromlyn, Co. Westmeath (*Mrs. B.*); Ardrahan (*Miss N.*) and Clonbrock, two (*R. E. D.*), Co. Galway; Roches Point, Cork.

POLIA CHI, *L.*—Widely distributed and frequently common. Neither the grey var. *suffusa*, Tutt, nor var. *olivacea*, St., nor Mr. Porritt's melanic form has been taken. The black network and *x* mark are sometimes faintly but often strongly marked, the females being greyer. The most dingy specimen I have comes from Ardrahan, Galway. I have noticed considerable numbers very conspicuous on the black basaltic rocks about Downhill, Co. Derry, no protective colouring being noticeable.

[POLIA FLAVICINCTA, *Fb.*—Mr. Birchall never took this insect in Ireland, I understand. He gave Co. Wicklow as a locality on hearsay evidence, but there is every possibility that it may turn up.]

Dasypolia templi, *Thnb.*—Mr. Birchall took six at light once at Howth, and detected the larvæ not unfrequently. Dr. Hart also has a specimen taken there. Glenarm Castle, Co. Antrim; Greencastle, Inishowen (*W. E. H.*); Clonbrock, one (*R. E. D.*).

Epunda lichenea, *Hb.*—Common at Howth. Mr. M. Fitzgibbon took an interesting aberration of purplish grey tone there, but not like the handsome purple-spotted variety found about Plymouth, &c. Very abundant at Rossbeigh, Co. Kerry (*Salvage*).

Epunda lutulenta, *Bork.*—The type does not occur in Ireland to my knowledge. It is noticeable that in the English typical form the shaded nervures and row of spots of hind'wings, generally present in the two following varieties, are wanting. Vars. *luneburgensis*, Frr., and *sedi*, Gn., are the representatives in Ireland of this species. Mr. Tutt (Brit. Noct. p. 53), in treating of the former variety, has very ably cleared up the difficulty and confusion into which I was led (Entom. xxvii. 14) by Staudinger's misdescription of var. *luneburgensis*, Frr., and has made it very plain that Freyer's name should be attached to the almost black form taken in Ireland, Scotland, and in several places in England. Mr. Tutt notes Morpeth, Mr. Hodgkinson took it in Lancashire, and Mr. Bond had it from Cambridgeshire. In a letter, he said:—"I have two males and two females with the wings nearly black, and markings very faint or wholly wanting. They look at first sight like *E. nigra*. This seems to be the most prevalent variety in the southern portion of England." He also describes three var. *sedi* from Wales as "of silvery ash colour, with the same markings as var. *luneburgensis*." Both the varieties thus described occur in Ireland, sometimes in considerable abundance. By the distribution in England and on the Continent it seems evident that they are phylogenetic varieties, and their occurrence without the type in Scotland and Ireland is not the result of any climatic influences at present subsisting, nor has any bearing on the origin of recent melanic forms. It is worth noting that as the almost unicolorous brown type is locally attended by its grey unicolorous var. *consimilis*, St., so the well-marked var. *luneburgensis*, with spotted and rayed hind wings, is accompanied by a grey form *sedi* with parallel characters. Such phenomena often throw light on zoological problems. I have had much assistance from Mr. Dobree, of Beverley, in studying the various forms of this species. Var. *luneburgensis* occurs on both shores of the Foyle, Co. Derry; at Kilderry (*C.*), Magilligan, and Castlerock, where Mr. Bristow took it (Mr. Birchall's record of Wicklow being an error). Var. *sedi*, Gn., also is taken at the Foyle localities, and I have specimens from thence of the trivial var. *tripuncta*, Frr., with small pale spots in the reniform; and one approaching var. *albidilinea*, Tutt. At Knocknarea, near Sligo, Mr. Russ took both varieties in considerable numbers, and with a considerable range of variation, some of the former having a considerable tinge of the typical ground colour, while some of the *sedi* being (as also at Ardrahan) of brownish grey tone. Birchall took some form of *lutulenta* at Kilcornan, and both vars. are at Ardrahan (*A. G. M. and Miss N.*). Both also near Crossmolina, Co. Mayo (*S. R. F.*).

Epunda nigra, *Haw.*—I have never seen Irish examples of this insect. Birchall gives "near Dublin and Galway" (probably Kilcornan) as localities. At Ballycastle, Co. Antrim, Curzon met with it, and sparingly also at Magilligan (*Salvage*). Mr. Meek got it from Glengarriff, Co. Kerry. Thus it seems extremely localised, but found in the extreme north and south, east and west of Ireland.

(To be continued.)

NOTES AND OBSERVATIONS.

Some Recent Auction Sales.—Second portion of Dr. Wheeler's Collection.—*Pachnobia alpina*, of which fewer seem to be now taken, in lots of 4, 7, and 8, with others, fetched 26/–, 42/–, and 45/–. *Dianthœcia barrettii* is also advancing in price, 11 specimens realising something like 8/6 each, which does not quite represent their true value, some of them being, as is, alas, so often the case in this species, in very poor condition. Two lots of 4 each of *Xylina conformis* made 47/6 and 35/–. Lots of 3 and 5 of *Cucullia scrophulariæ*, with others, 27/6 and 22/–. A pair and two triplets of *C. gnaphalii*, all of Tester's taking from Tilgate Forest, with other "sharks," went for 40/–, 35/–, and 30/–. The gem of this portion of the sale, judging from price, appeared to be a specimen of *Ophiodes lunaris*, taken at light by Dr. Wheeler himself, at Stratton Strawless, Norwich, in 1879, duly recorded, and which fetched £6; and a specimen of *Catephia alchymista*, 1895, 65/–. Four pairs of *Cleora viduaria* realised 25/–, 32/6, 18/–, and 16/–, the difference in condition being commensurate with the prices. The Micros were not in first-class condition, and, as is usual in such cases, went for next to nothing, two and three lots having to be bracketed together containing often as many as three hundred insects, going for 3/–, 5/–, and 10/– a lot.

Mr. W. Farren's Sale.—The extensive collection of Mr. W. Farren, of Cambridge, was sold on Nov. 19th and Dec. 2nd. The collection looked as if it had been a little neglected of late, and there was a trace of mould in many places; but on the whole the insects were in good order, and the collection contained, without doubt, the finest series of Fen forms sold at Stevens's auction-rooms for a long period. A series of vars. of *Papilio machaon*, including specimens with band of hind wings reaching cell, discoidal spot of hind wings obsolete, red in lunules, &c., made 30/–, and a fine asymmetrical var. 21/–. The clearwings were in good order, and, as usual, brought good prices. Lot 29, including a pair of *Sesia vespiformis*, went to Mr.

Janson for 35/–. Two small lots, including 3 and 4 specimens of *S. sphegiformis*, as usual, from Tilgate, went for 30/– and 32/6; both to Messrs. Watkins and Doncaster, who indeed, with the one exception above stated, purchased the remaining 3 lots of the Sesiidæ at 30/–, 20/–, and 14/– a lot. Three bred specimens of *Deilephila galii* from the late W. H. Tugwell, with 11 *Sphinx ligustri*, went for 8/–, about the cheapest lot in the sale. The one specimen of *D. livornica* was evidently not much believed in, as with 52 other insects it only made 8/–. *Nola centonalis*, which has apparently disappeared under the influence and ardour of golfists, is also quickly rising in price, 3 lots of 4 each, also from Mr. Tugwell, made 25/–, 25/–, and 20/– a lot. Curious vars. of *Arctia menthastri*, one with purple shot and one with buff fore wings, distinct from anything of the kind I have seen before, were not dear at 32/6. The *Lælia cœnosa*—two pairs—were poor, and therefore only realised 10/– and 14/–. A fine series of *Notodonta chaonia* and other prominents, including dark vars., fetched 47/6. Mr. Farren's series of *Bryophila impar* was, I should think, the finest in existence; lots of 4 or 5 each, with other things not by any means rubbish, made 22/–, 21/–, 45/– (including nice ochreous *B. perla*), 30/–. Ditto, 18/–, 26/–, 22/–, and 18/–. The wainscots were all in good order, 2 lots; including dark forms of *Arsilonche venosa*, with other things, went for 20/– and 21/–. A pair of *Tapinostola concolor*, with *T. elymi* and *Nonagria neurica*, for 28/–. A single female *Noctua subrosea* for 22/. Seven *Pachnobia alpina* and others, 21/–. A nice series of *Xanthia aurago* and *Cirrhœdia xerampelina*, 26/–. The Geometræ contained nothing very striking except a fine var. of the disappearing *Cidaria sagittata*, in which the dark bands were nearly obsolete. I should think such a var. practically unique, and it certainly was not dear with 19 very fine typical *sagittata* and other things at 65/–. *Cidaria reticulata* fetched about 10/– each. Two specimens of *Polyommatus dispar*, collected by the late Jno. Curtis, were also included in the sale; they were both undersides, and in medium condition; one fetched 2 guineas, the other £2. The Tineæ, although in very nice condition, went for poor prices: and in very many cases 2 lots had to be joined before a purchaser could be obtained. Messrs. Fletcher and Banks pretty well divided this part of the collection between them. The highest priced lots were those containing *Gelechia divisella*, which went for 22/–. *Doryphora lucidella*, *D. morosa*, and others, 20/–. *Acrolepia betulella*, &c., 42/–. *Nepticula cryptella* and others, 30/–. The new *Cataplectica farreni* were sold in lots of 4, and made 7/–, 8/–, 10/–, and as low as 6/– a lot.

Mr. W. H. Tugwell's Sale.—On Dec. 10th the first portion of the late Mr. W. H. Tugwell's collection was sold. Mr. Tugwell and his collection have been household words with most of us for many years past. He did not retain long series, but the specimens were mostly picked, and embraced good varieties and local forms. Many series were bred by himself or his friends. Granting this, it is perhaps not remarkable that record prices were obtained in more than one or two instances. At the same time I think the collection was a little overcatalogued, and I am inclined to think that it is a mistake not to leave the cataloguing in every case in the hands of the profession. I noticed in one instance (lot 18), that whilst a second-rate var. of *Argynnis selene* with confluent spots was specially mentioned, a specimen of, to my mind, a far rarer variety, showing a silver blotch on the upper surface of the wing, was not mentioned. Some one, however, spotted it, as the lot fetched 50/–, and even at that price Mr. Janson's customer may be congratulated on having secured a bargain. To take the collection in order:—Lot 4, a specimen of *Pieris daplidice*, taken at Dover in 1851, by Mr. Foxcroft, dusky with age, was acquired by the writer for 11/–; two other good ones, with no history, 8/– and 6/– each. Lots 7 and 8, which were combined, contained what was described as a "magnificent" male *Colias edusa*, showing a rose-magenta shot colour; this, to my mind, was nothing more than the rose-shot colouring which is not at all uncommon in this species. Apparently others thought so too, as the 2 lots together, containing 52 specimens, only fetched 10/–. Lot 10 was a great bargain: a specimen of *Argynnis adippe* from Devonshire, 1874, in which the outer half of the primaries was suffused, making a rather striking variety, realising only 20/–. Possibly Mr. Janson's determined bidding may have induced others to leave off the contest too early; it was, to my mind, quite as good a variety as one sold a few sales back for something like £6. Mr. Tugwell's specimen of *Anosia plexippus*, captured by Mr. Saundry, Cornwall, 1886, sold for 35/–. Four *A. latonia*, Kent, all fine, but with no other history, fetched 12/–, 8/–, 8/–, and 6/– each. Lot 16, containing a fairly good variety of *Argynnis euphrosyne* and a slightly dusky female *A. selene*, with a rather pretty lot of *Melitæa artemis*, fetched 16/–. Lot 17, about similar, 12/–. Lots 19, 20, and 21 each contained a dull lilac or purple-brown variety of *Vanessa urticæ*, and realised 21/–, 14/–, and 10/–. In lots 22, 23, and 24 were, amongst other things, specimens of *Apatura iris*, described as New Forest white-banded, Chattenden yellow-banded, a distinction I believe pretty constant in those localities; they were quite ordinary forms, and fetched 16/–, 18/–, and 12/–. The collection contained two specimens of *Vanessa antiopa*, both taken by Mr. Sang, Darlington, 1873. One nice specimen made 18/–, and one with yellow borders 16/–. Lots 27, 28, and 29 were sold together for 10/–. The pale variety of *Arge galatea*, as per catalogue, was only a faded female, but the lot was cheap, containing as it did some nice forms of *Erebia blandina*, well spotted. There were 8 specimens of *Polyommatus dispar;* the first 3 males were small and in moderate condition, but were cheap nevertheless at 45/–, 55/–, and 63/–; a richly coloured male made £5, and a large male from Mr. Howard Vaughan's collection 7 guineas, which is, I believe, a record price; the latter two were bought by Mr. Janson. A fine female made 70/–, but the magnificent variety of the female from Mr. H. Vaughan's collection had been evidently "faked" at some period of its existence; it looked as if it had been carelessly mended and blotched with shellac or some such substance, which had been subsequently removed, leaving scaleless stains. It was a pity such a fine large specimen of this rarity should be so spoilt; it was bought for 45/–. The eighth example, a fine female, was also bought by a prominent dealer for £6, and was fully worth it too. The first pair of *Lycæna acis*, from Mr. J. G. Ross, fetched no less than 35/–; the second pair, including a large female from Mr. Evan John, Llantrissant, was bought by the writer for 30/–. It is curious to notice how this insect fluctuates in price. I believe Mr. H. Vaughan's 11 fine specimens were sold in one lot, and only made something like 3/– each; at the Rev. H. Burney's sale, in November, 1893, 9/– each; Downing's sale, October, 1894, 6/– each; Jenner Weir's sale, May, 1894, 10/– each; at Machin's sale, February, 1895, one pair, 40/–, and a pair and an under side, 50/–: at Robson's sale, 18/– each; and at Dr. Wheeler's sale, July, 1885, only 6/– each. Personally, I believe, even at 15/– apiece, good, well-authenticated specimens are cheap; but, as it occurs fairly freely on the Continent, its price will never approach that of *Polyommatus dispar*. *Lycæna arion*, for about the first time, were sold in pairs, and made 8/–, 6/–, 7/–, 8/–, 11/–, 9/–, 7/–; triplets, 10/– and 10/–. Two Torquay *Deilephila livornica*, from Mr. King, 20/– and 7/–; one from Dr. Knaggs' collection, 13/–. Three lots of *D. galii* (4 in a lot), bred by Mr. Tugwell, 21/–, 42/–, and 40/–. One *Chærocampa celerio* from Brighton, 26/–. *Sesia scoliiformis*, of which there were 12 specimens, realised an average of about 6/–. The burnets were all good: three lots each, including 6 *Zygæna exulans* and yellow *Z. trifolii*, made 35/–, 55/–, and 42/–. Vars. of *Z. loniceræ* and *Z. filipendulæ*, 50/–, 84/–, and 65/–. The unique British example of *Syntomis phegea* went to Mr. Banks for 60/–. *Nola centonalis* made about 4/6 each. Three lots of 6 *N. albulalis*, with the IVI var. of *Setina irrorella*, 30/–, 30/–, and 35/– a lot. Two specimens of *Deiopeia pulchella*, 11/– and 30/–. A var. of *Arctia caia* with dark fore wings, hind wings with blue-black band, made 35/–; and a specimen described as a unique var., with black hind wings, but which was to my mind much over-estimated, 95/–. Series of vars. of *Arctia caia* and *villica*, 52/6, 63/–, and 35/–. Mr. Tugwell was noted for his success in breeding fine forms of *Spilosoma lubricipeda*, and especially the vars. *eboraci*, *radiata*, and *fasciata*; his cabinet series, sold in lots of 8, made 25/–, 25/–, and 35/–; whilst a splendid radiated var. of *S. menthastri* from Dundee made 60/–. Eight old fen forms of *Ocneria dispar*, 32/6; three pairs of *Lælia cœnosa*, 12/–, 12/–, and 18/–; and an exceptionally large male, 15/–. Three Cannock Chase *Lasiocampa ilicifolia*, 32/6, 37/6, and 47/6. Three lots of *Drepana sicula*—three in a lot—35/–, 32/6, and 32/6. Ditto of *Dicranura bicuspis*, all from Tilgate, 33/–, 27/6, and 27/6; and a pair, 18/–. Two *Leucania vitellina*, 22/– and 26/–. Two *L. albipuncta*, 30/– and 28/–. Two lots of 4 *Tapinostola concolor*, from Mr. Vipan, 14/– and 16/–. Four lots of 2 and 3 bred *Xylomiges conspicillaris*, 16/–, 20/–, 22/–, and 18/–. Two pairs of *Laphygma exigua*, 40/– and 35/–. Two lots of 3 each of *Pachetra leucophæa*, 12/– and 14/–. Two pairs of bred *Nonagria sparganii*, from Mr. Sidney Webb, 18/– and 16/–. Three pairs of *Crymodes exulis*, 18/–, 27/6, and 28/–. A specimen of *Hydrilla palustris*, with a doubtful record, 21/–. Two lots of 5 *Agrotis ashworthii*, with 4 *A. pyrophila* and others, 16/– and 17/–. Two pairs of *Noctua subrosea*, out of which there was only one good specimen, 80/– and 30/– a pair. Two lots of 6 each of *Pachnobia alpina*, with other things, 22/– and 32/6. Two specimens of *Cerastes erythrocephala*, 12/– each. Three pairs of *Dianthœcia barrettii*, 28/–, 25/–, and 30/– a pair. Two of *Polia nigrocincta*, 5 in a lot, 21/– and 30/–. Two lots of 4 each of *Xylina conformis*, bred by Mr. Tugwell, 50/– and 42/–. One specimen of *Cucullia gnaphalii*, also bred by Mr. Tugwell, the astounding price of 55/–. I suspect there was some sentimental reason for such a high figure; and yet there must have been two bidders at least. This must be an easy record. A single specimen of *Thalpochares ostrina*, with no history, went for 14/–. Two pairs of *Plusia moneta*, with 3 *P. bractea* and others, 32/6 and 45/–; and a single specimen of *Ophiodes lunaris*, taken at Hailsham, May, 1875, 95/. The last few lots in the sale were extended series contained in store-boxes: *S. lubricipeda* var. *fasciata*, with parent moths, made 20/–; ditto, *fasciata* and *eboraci*, 21/–; ditto, *radiata*, 16/–, 12/–, and 16/–; ditto, *eboraci* crosses, 26/– and 21/–. Lots of 6 each of *Zygæna exulans*, 14/–, 12/–, 12/–, 14/–, and 16/–. Two fine spotless pale vars. of *Venilia maculata*, with others, 65/–; and a lot containing fine varieties of the thorns, 50/–. Altogether, the first portion of the sale, without any cabinet to swell the total, realised £311 3*s*.—Thomas William Hall; Stanhope, The Crescent, Croydon.

[The following note from Mr. Adkin may be added as a postscript to the above.]

The remaining portion of the collection formed by the late Mr. W. H. Tugwell, together with cabinets, &c., was disposed of on Jan. 20th, and realised upwards of £150, the most important items being:—Three *Cleora viduaria*, taken by the late Chas. Tester in Tilgate Forest, £1 17s. 6d.; two *Boletobia fuliginaria*, bred by Mr. Tugwell, £2 7s. 6d.; and seven other specimens at a similar rate. A black white-banded variety of *Abraxas grossulariata*, brought the lot in which it was contained up to £1 10s., as did a fine example of *Sterrha sacraria* to £1 6s. Four *Phibalapteryx polygrammata* sold for £1 10s.; twelve *Cidaria reticulata* at an average of 9s. 6d. each; and two *Margarodes unionalis*, taken by Mr. Tugwell at Deal, for £2 15s. and £1 10s. each respectively; while two *polygonalis*, with a similar history, brought the unprecedented prices of £4 15s. and £3 3s.—R. A.

Palæarctic Rhopalocera.—As I am collecting data respecting the geographical and vertical distribution of these, I shall be much obliged for local lists of species, with notes, from those who have collected abroad, especially from Russia, North Africa, and Armenia. Lists from all the European countries will be very acceptable.—W. Harcourt-Bath; Ladywood, Birmingham.

Polia chi and its var. olivacea bred from the Egg.—In the early spring of 1895 I had some eggs deposited by females of the type and *olivacea* forms of this species sent to me from Durham. The male parents were unknown. The eggs began to hatch at the end of April, *olivacea* being first by three or four days. I found the larvæ would eat dock, hawthorn, oak, and groundsel. As they preferred groundsel, I fed them almost entirely upon it. The caterpillar is fully and accurately described in Newman's 'British Moths.' Although I examined the larvæ on several occasions, with the help of a strong lens, I found not the slightest difference between *chi* and *olivacea*, which, of course, were kept in separate flower-pots. The *olivacea* all pupated by June 15th, the *chi* by June 24th. Some of the latter, late ones, died of diarrhœa. On June 26th there was a severe thunderstorm, with heavy rain, and all the pots were submerged for about half an hour in water. This had little or no effect upon the pupæ, every one of which, I should say, produced a moth. *Chi* were the first to show themselves, from Aug. 4th to 14th. Imagines of *olivacea* appeared from Aug. 10th until Aug. 22nd. Several of the *chi* pupæ produced the var. *olivacea*, but none of the *olivacea* produced *chi*. Many specimens of the variety were so dark an olive-green as to be almost black, the white markings showing up handsomely on the dark ground. In the Chester district, North Wales included, I take the species (but never the variety) chiefly from the old walls of Beeston Castle, on a high wooded precipitous hill to the left of the railway between Crewe and Chester. The form for this district is pale and weakly marked in comparison with the handsomer Durham one. At Beeston, on Aug. 14th and 17th, I took altogether twelve *P. chi* from off the castle walls, where the moth rests during the day. These were chiefly for pairing purposes. The results were as follows:—*Chi*, either from Beeston or Durham, or when crossed by each other, paired readily, and I got plenty of eggs; *chi* crossed with *olivacea*, or *vice versâ*, paired badly, and I only got about twenty eggs; *olivacea* failed. One of the females laid a dozen or more infertile eggs.—J. Arkle; 2, George Street, Chester.

Polia nigrocincta bred from the Egg.—In March, 1894, I received thirteen eggs of *P. nigrocincta*. The parent moth had been taken the previous season by Mr. Murray, of Carnforth, in the Isle of Man. The eggs began to hatch on April 19th. Although the larvæ had every attention, and full choice among the prescribed food-plants,—different campions, violet, harebell, plantain, &c.,—they ate very little, and died, one after the other, up to July 24th. A second batch of thirteen eggs, in 1895, hatched April 26th. The egg is dome-shaped, pale purplish brown, with a considerable apical zone of the same colour, but much deeper in tint, almost black. It is ribbed, the ribs standing out prominently, especially from the centre of the apical zone. In the centre of this black-purple-brown zone is a raised dot. From this dot spring the raised ribs, nine or ten in number. These presently subdivide, and spread longitudinally over the bulk of the shell. The stages I observed in the growth of the caterpillar are the following:—First (after hatching): One-eighth of an inch long; a few bristles on each segment. To the eye the caterpillar appears the width of a fine stroke with the pen. Head pale, clouded with light brown. Body pale dull green, also claspers. First five segments (after the head) dark purple, dorsally, but this is not a constant character. Each segment has four dorsal black spots, and two on each side. These spots form two dorsal lines and a line along each side. In walking the larvæ loop like geometers, and, if alarmed, sit up in the form of the letter S. Both these characteristics are observable in *P. chi*. Second stage: Head green and clouded with yellowish. Dorsally the segments are dull dark green. Below the spiracles the colour, including the legs and claspers, is bright apple-green. Along the whole of the dull dark green dorsal area is a central whitish-green line. There is a similar line along each side, the side lines being just situated in the dull green dorsal area. The four dorsal spots each emit a minute bristle. The segment divisions are clearly marked dorsally in whitish green. The head is smaller than the following segment, and the caterpillar tapers towards the extremity. It does not like microscopic examination, and starts off rapidly when the lens is above it. Third stage: Green, with a not very distinct yellowish-green stripe along each side containing the spiracles. The spiracles are yellow, surrounded by black rings. Fourth stage: In 1894 this stage was reached June 17th; in 1895, a much warmer season, on May 29th. Head, segments, claspers, apple-green. There is a thin whitish yellow medio-dorsal line, and an exactly similar line on each side of the larva. Below the side line, and including the spiracles, is a broad yellowish white stripe. The spiracles are white-yellow with black rings. The four dorsal spots on each segment are white-yellow. The geometer-like character of looping is now lost. To the eye the caterpillars appear apple-green, with a yellow stripe or line along each side. They never got beyond this stage with me in 1894. Fifth stage: June 11th, 1895. The head and second segment are pale brownish green, with darker markings. The second segment is mottled on the sides with brown. The dorsal area of the remaining segments is olive-green, conspicuously mottled with warm reddish brown. Segment divisions reddish. Each segment has, dorsally, four dark brown spots, with dull yellowish centres. There is a dull yellow stripe along each side containing the reddish spiracles, which are surrounded by black rings. The caterpillar is green underneath, slightly mottled with brown. Legs pale reddish brown; claspers green. The caterpillar has now reached its final stage. Seen without the aid of a lens it appears as follows:—The head is pale greenish brown, and slightly smaller than the second segment. The body is cylindrical and reddish olive-green dorsally. The red tint predominates, and resembles the deep blush on a ripe apricot. When moving about the segment divisions are more exposed, and are of a brighter red than the back of the caterpillar; along each side there is a dull yellow stripe; these side stripes have a waved appearance, as if composed of a series of crescents, one crescent on each segment. The legs are pale reddish brown, the claspers green. Newman, in his 'British Moths,' p. 395, remarks upon the similar appearance of the caterpillar, doubtless when fully grown, to that of *Epunda lichenea*. I compared his description of the latter species (p, 400) with my *P. nigrocincta* larvæ on July 17th. The chief points of difference are that in *P. nigrocincta* the head is "tessellated" with darker markings; secondly, the back of the caterpillar is without indistinct lozenge-shaped oblique marks. Thirdly, the dorsal reddish colour in *P. nigrocincta* is very pronounced. Still it may be very easy to confound the species. The larvæ preferred groundsel to everything else. They began to pupate on June 13th. Here the curtain drops on their history, for they never appeared again. I did not rear a single moth. True their pots were submerged in the heavy triple thunderstorm of June 26th. But I certainly expected them to follow some sort of suit to *P. chi*, and show a moth or two at least. It seems to be a difficult species to rear from the egg, and I shall be glad to hear if this has ever been done.—J. ARKLE; Chester, Jan. 2nd, 1896.

SOME CONTINENTAL VARIETIES OF BRITISH SPECIES RECENTLY RECORDED. —*Amphidasys prodromaria.*—M. F. Delahaye chronicles two vars. of

A. prodromaria, male and female. The male has the ground of the primaries of a dark greenish colour, which is most apparent in the space between the two brown bands. These, on account of their blunted angles, are considerably wider than in the type towards the lower border. The brown band which adjoins the terminal border is very dark, almost black, and extends nearly up to the fringe. The other band at the base of the wing is similarly widened and coloured. The large black dot in the area between the bands is elongated in a fine line nearly to the internal border. The secondaries present a clouded appearance, darker than in the type, with the fringe more largely spotted with greyish black. The thorax is about three parts black mixed with greenish. The collar is encroached upon by the black, but the antennæ and abdomen do not show any peculiarity. The female is still more curious, and seems to defy exact description. If as in the case of the male the median space in the primaries is larger than ordinary, it does not present a uniform colour; for whereas the lower part is mixed with black, greenish, and russet-colour, the part which approaches the side is clearer, the green passes gradually into dark grey, while the large black dot is opened out into a V-shaped mark. The same effect is brought about in the space between the first band and the base of the wing, but in this area it is the black which prevails. Concerning the second or outer band, the black has encroached, becoming more and more dense, up to the fringe, and so completely that only two small white spots remain. The secondaries are still darker than those of the male. The antennæ and thorax are nearly black. The moth presents a fine velvety appearance where the black predominates. (*Le Naturaliste*, No. 196, p. 105.)

The following have been caught in the district of Vladimir, Russia:—

Epinephele ianira, ab. ♀ *illustris*, var. nov.—Above clear brownish grey with metallic lustre. The yellow patch of the primaries clearer than in the type. The secondaries with a muddy yellow central spot, as in var. *hispulla*, or without such.

Euchelia jacobææ, L., with yellow hind wings.

Angerona prunaria, ab. *sordiata*, Füssly. — A gynandrous specimen has been caught in the government of Moscow.

Melitæa aurinia, Rott.—A gynandrous example of this species was taken in the district of Vladimir. (A. Jachontoff, Societas Entomologica, 1895.)

Callimorpha dominula.—At a meeting of the Entomological Society of Belgium, held Sept. 7th, 1895, M. Hippert recorded the capture of an aberration of *C. dominula* with orange spots, taken at Rochefort in June, 1895.—W. MANSBRIDGE.

GLOWWORMS IN OCTOBER.—Noticing Mr. Reid's observation upon this subject (*ante*, p. 24), I beg to state that the "females" he captured were in reality the larvæ. The imago beetle is only abroad during the summer months, and the records one periodically sees in the papers of "late glowworms" invariably refer to the larvæ of *Lampyris noctiluca*. I myself took larvæ of this species here within three days of Mr. Reid's observation. I have taken it from moss in mid-winter, and again late in March, after which time it soon assumes the pupa-state, the perfect insect generally appearing about the middle of July. These insects should never be wantonly killed by the horticulturist, as they destroy an enormous quantity of snails, for cleaning itself from the slime of which the larva is furnished with a little brush at the apex of the abdomen. Another curious and not generally known fact is that this species is luminous throughout all its stages, both egg and pupa, as well as larva and perfect female, giving off their phosphorescent light; occasionally also a faint glimmer may be detected in the male. The female may easily be distinguished from the larva by its obvious antennæ and the absence of lateral yellow marks on each segment of its body.—Claude Morley; Ipswich.

CAPTURES AND FIELD REPORTS.

Hawk-Moths in East Kent in 1895.—During the past year several of the hawk-moths have been very plentiful near Wye, in Kent. During June numbers of *Chærocampa porcellus* could be taken along the foot of the North Downs near Wye, especially on the old racecourse. They were mostly seen at rest on bedstraw and on grass. I was unable, however, to find any larvæ at the end of the summer. Several *C. elpenor* were also taken along the banks of the Stour, on the large willow-herb, near Ashford, and one at Wye. In October two full-fed larvæ (both the dark type) of *Sphinx convolvuli* were brought me, found in some allotment gardens on potatoes. On examination of the ground I found, however, any amount of convolvulus growing amongst the tubers. Several others, the labourers told me, had been found, some quite green; whether these were the green form of *S. convolvuli* or *Acherontia atropos* larvæ I cannot say. *Smerinthus ocellatus* was very abundant, in the larval state, on osiers between here and Ashford, and *S. tiliæ* and *S. populi* plentiful generally in the district. *Sphinx ligustri* I have seen little of, only two larvæ having been observed, but I am told it is usually common in this neighbourhood.—Fred. V. Theobald; Wye Court, Kent, Jan. 1896.

Vanessa antiopa at Epsom.—There have been so few records of the occurrence of this grand insect in England of late years that the following may prove interesting to the readers of the 'Entomologist.' A lady who lives in Epsom found, on Dec. 19th, a butterfly sitting on the ashes in the fireplace of one of her rooms. When she first saw it she mistook it for a cinder, and it seems most wonderful that the insect should have chosen a resting-place so very similar in colouring to the under-surface of its own wings. I saw the butterfly on Dec. 20th, and found it to be a Camberwell Beauty in fairly good condition. There can be little doubt that it entered the chimney in which it was possibly attempting to hybernate. The outer parts of the wings are of a whitish colour, then followed by a band of black containing blue spots, and inside this band to the body is a rich chocolate-brown.—Edmund H. Lancaster; White Cottage, Epsom.

Eupithecia albipunctata bred in December.—Upon examining some of my breeding-cages, on Dec. 19th, I was surprised to find a fine freshly-emerged specimen of this moth. The cages are kept in an open shed facing the east, and there had been some sharp frosts on the 8th, 9th, and 10th of the month. In another cage was a dead *Hadena suasa* which had come out during the autumn.—Gervase F. Mathew; Dovercourt, Jan. 13th, 1896.

Eugonia alniaria (Ennomos tiliaria).—On Aug. 15th a friend of mine took a specimen of *Ennomos tiliaria*, and on the 19th of the same month I also captured another; they were both upon the gas-lamps near Leytonstone Station, and were in excellent condition. I believe this species to be very scarce in this locality, never having seen it here before.—G. R. Garland; Leyton, E., Dec. 19th.

Hybernia defoliaria abundant.—On Dec. 1st I paid a visit to Hawk Wood, Chingford, and I had not gone far before I came across *H. defoliaria* in endless profusion, both male and female, the dark variety (as illustrated by Newman) far exceeding the others in numbers. I may mention that I have bred what I believe to be a remarkable variety of this species this season, the ground-colour of the wings being orange-ochreous, with broad bands of a dark chocolate colour (almost black). On the above date I saw only two specimens of *H. aurantiaria*, while *Cheimatobia brumata* was fairly common.—G. R. Garland; Leyton, E., Dec. 19th.

Xanthia ocellaris in Suffolk.—On Dec. 7th I received a box of insects taken at light by Mr. A. B. Corder, of Ipswich, during the past autumn. Amongst them I was surprised to find a very perfect male of *X. ocellaris*, with the characteristic white dot under the reniform stigma showing up clearly: had it not been for this I should almost have taken it for a variety of *X. gilvago* with the usual smoky clouds absent. As there are now several records for Ipswich, it is much to be hoped that this interesting addition to our fauna may establish itself there permanently.—Jas. W. Corder; 1, Ashbrooke Terrace, Sunderland, Dec. 30, 1895.

Lepidoptera of Ireland.—As an addition to the list of localities for *Cirrhædia xerampelina*, given by Mr. W. F. de Vismes Kane in his Irish Catalogue (Entom. xxviii. 327), I may mention that in the last week in August I took two specimens at Glendalough, Co. Wicklow, which came to light at the hotel windows. I sugared for them on the ash, but did not find any more, though I took several specimens of *Xanthia fulvago* (*cerago*). The specimens of *Polyommatus phlœas* from this district were exceptionally large and bright.—Douglas H. Pearson; Chilwell, Notts, Dec. 3rd.

Sphinx convolvuli in W. Africa.—While everyone is recording *S. convolvuli* at home, why not record its appearance further afield? I picked up a larva the other day feeding on convolvulus, and a fortnight after bred a specimen of *S. convolvuli*. This is the first I have seen, though an allied species [? *S. pseudoconvolvuli*, Schauf.—Ed.], also a convolvulus-feeder, is common. This latter is darker, with two cream-coloured dots in the centre of the fore wings. All these hawk-moths are easily bred here, going through their transformations in a very short space of time. *Chœrocampa nerii* I have lately found here, but not commonly; probably, if I knew its habits, it would not be scarce.—Geo. A. Harker; Gd. Bassam, Dec. 4th, 1895.

Locusta peregrina, Oliv., in London.—It may be of some interest to entomologists to know that on the 10th ult., near here, I picked up a fine example of the above species in a semi-dormant state. On setting this insect the following day I was rather surprised to notice how little the worse it was, considering the tempestuous weather it must have experienced. It measures $4\frac{15}{16}$ in. from wing to wing and $2\frac{1}{16}$ in. from the head to the abdominal extremity: it has the characteristic markings, *i.e.* elytra light sepia, faintly mottled. I have never heard before of this exotic insect having been found singly in this country, but believe this is the first instance of its having been taken in London.—F. W. **Bell-Marley** Ravenscourt Park, Jan. 16th.

SOCIETIES.

Entomological Society of London.—*December 4th*, 1895.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. S. H. Scudder, of Cambridge, Mass., U.S.A., was elected an Honorary Fellow to fill the vacancy caused by the death of Prof. C. V. Riley. Lieut.-Col. C. T. Bingham, of 4, Waverley Place, St. John's Wood, N.W.; Captain C. G. Nurse, of 5, St. Mary's Square, Bury St. Edmunds; and Mr. E. F. Studd, M.A., B.C.L., of Oxton, Exeter, were elected Fellows of the Society. The Secretary read a copy of a letter of condolence which he had written, by the direction of the Council, to the Entomological Society of France on the death of their President, Mons. E. L. Ragonot; and he also read a letter in reply from the Secretary of the Entomological Society of France. Mr. R. Adkin exhibited a specimen of *Mesogona acetosellæ*, taken at Arlington, Sussex, in October, 1895. It was stated that this was the first recorded capture of this species in Britain. Mr. G. T. Porritt exhibited an example of *Halesus guttatipennis*, taken at Lye, Worcestershire, in November, 1889. It was believed to be the third British example. Mr. Porritt also exhibited a series of *Mania typica*, showing a curious malformation in all the specimens. He stated that about one-third of a large brood had emerged in exactly the same form, having the wings only half developed, but with the markings clearly defined. Mr. Tutt and Mr. McLachlan referred respectively to similar malformations in *Agrotis tritici* and *Hadena chenopodii.* Mr. Goss read a communication from Mr. Sidney Crompton, of Salamanca, Tenerife, announcing the capture there by Mr. Hammerton of two specimens of *Diadema misippus*, a species of butterfly not previously recorded from Tenerife. Mr. Crompton said the specimens were in such fine condition that they must have been introduced into Tenerife in the larval or pupal state and emerged there. Mr. Hampson, Prof. Meldola, and Mr. Osbert Salvin made some remarks on the distribution of the species. Mr. Champion read a paper entitled "On the Heteromerous Coleoptera of St. Vincent, Grenada, and the Grenadines." Mr. Kenneth J. Morton communicated a paper entitled "New or Little known Palæarctic Perlidæ."—H. Goss & W. W. Fowler, *Hon. Secs.*

January 15th, 1896.—63rd Annual Meeting, the President in the chair. The following gentlemen were elected as Officers and Council for 1896:—President, Prof. R. Meldola, F.R.S.; Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Herbert Goss and the Rev. Canon Fowler, M.A.; Librarian, Mr. Geo. C. Champion; and as other Members of the Council, Mr. W. F. H. Blandford, M.A., Mr. G. F. Hampson, B.A., Prof. Edward B. Poulton, M.A., F.R.S., Mr. Osbert Salvin, M.A., F.R.S., Dr. D. Sharp, M.A., F.R.S., Mr. Roland Trimen, F.R.S., The Rt. Hon. Lord Walsingham, LL.D., F.R.S., and Col. J. W.

Yerbury, R.A. It was announced that the President would appoint Dr. D. Sharp, Mr. Roland Trimen, and Mr. W. F. H. Blandford, Vice-Presidents for the Session 1896–1897. Prof. Meldola then delivered an Address, in which he first drew attention to the remarkable literary activity of the entomologists of this country during the past year, referring particularly to the works recently published by Miall, Meyrick, Barrett, Rye, Lucas, and Buckton; and to the new volume of 'The Cambridge Natural History,' by Sedgwick, Sinclair, and Sharp. Attention was also called to the interesting discoveries in insect physiology by Latter and Hopkins. The main portion of the Address was devoted to a plea for a more liberal use in biological work of the theoretical or speculative method which had proved so fruitful in other branches, and which, in the President's opinion, might with advantage be more freely employed in connection with entomological investigation. Illustrations were taken from the work of Bates on mimicry, Wallace on the colour of insects, and Poulton's researches on variable colouring, all of which had been prompted by hypothesis, and which had led to discoveries of large bodies of facts which would never have been gleaned by haphazard observation. In conclusion, the President referred to the losses by death during 1895 of many Fellows of the Society and other entomologists, special mention being made of Prof. C. V. Riley, Prof. C. C. Babington, F.R.S., The Right Hon. T. H. Huxley, F.R.S., M. E. L. Ragonot, Major J. N. Still, Prof. Carl E. A. Gerstäcker, M.D., M. Claudius Rey, M. Jules F. Fallou, and Mr. W. H. Tugwell.—H. Goss, *Hon. Sec.*

South London Entomological and Natural History Society.—*November* 28*th*.—Mr. T. W. Hall, F.E.S., President, in the chair. Mr. Chipps, of Barnes, S.W., was elected a member. Mr. R. Adkin exhibited a specimen of *Mesogona acetosellæ*, Hb., a species new to Britain; it was taken on October 26th near Brighton. Mr. Adkin also exhibited a series of *Coremia munitata*, Hb., from Hoy, with series of the same species from Shetland and Paisley, and of *C. designata*, Hufn., for comparison, and read notes on the variations exhibited. Messrs. Barrett, Tutt, and Carrington remarked on the habit of the species of flying during the daytime in elevated, exposed, and alpine regions. Mr. H. Moore, a long series of *Ocneria dispar*, L., bred from a Bordeaux female; they were all small, owing to the larvæ being fed on hawthorn it was thought. Mr. Carrington, four xanthic specimens of *Epinephele ianira*, L., from Leigh, Essex, taken in the same field in 1890–91; also he showed typical and lemon-coloured forms of *Hesperia lineola*, L., from Shoeburyness. Mr. Clark, a number of large and well-executed Micro-photographs. Mr. Hy. J. Turner, a specimen of the moorland form of *Noctua festiva*, Fb., from Carlisle; *Crambus pinellus*, L., from Box Hill; a very rosy specimen of *Anticlea rubidata*, Fb., bred, from Chichester; and a pair of *Coccyx cosmophorana*, Tr., from Carlisle. A long discussion took place on the life-history of this latter species. Mr. McArthur had bred a number from the knobs produced by *Retinia resinella*, a year after they had emerged, and said that he found the larvæ in the frass of this species. It was not found at Rannoch, but had been recorded from several localities where *R. resinella* was not known to occur. Mr. Ashdown, a bred specimen of *Acronycta alni*, L., from Richmond; and a specimen of *Eumenes* *coarctata*. Mr. Briggs, an Orthopteron, *Periplaneta australasiæ*, taken at Kew, and new to Britain.

December 12*th*, 1895.—The President in the chair. Mr. Searancke, of Mitcheldean, Gloucester, was elected a member. Mr. Barrett exhibited, on behalf of Mr. Brooks, of Rotherham, a long bred series of *Boarmia repandata*, L., including black forms, and forms having the dark markings intensified but not extended; a series of the grey form of *Tephrosia biundularia*, Bork., both from Rotherham; and a large number of specimens of Lepidoptera collected near Lake Tanganyika, from Nov. 1892 to Feb. 1893, including two recently-named species, viz. *Pseudospiris paidiformis*, Butl., and *Sapæa trimeni*, Butl. It was noted that several species exhibited also occurred in Natal. Mr. Carpenter, *Tæniocampa munda*, Esp., *T. gothica*, L., *T. stabilis*, View., *T. incerta*, Hufn., *T. pulverulenta*, Esp., *Pachnobia rubricosa*, Fb., and reddish *T. gracilis*, Fb., taken at sallow-bloom in his own garden at Streatham. Col. Partridge, a nearly pure white *Cucullia absynthii*, L., bred at Portland. Mr. Barrett, on behalf of Dr. Mason, a number of extreme varieties of Lepidoptera, including *Agrotis segetum*, Schiff., uniformly pale and destitute of markings, a unicolorous *A. corticea*, Hb., a dark suffused *Acronycta alni*, L., a unicolorous pale *Noctua augur*, Fb., extreme dark and light forms of *A. lucernea*, L., *A. simulans*, Hufn., *A. agathina*, Dup., and *Ptilophora plumigera*, Esp., a pair of *A. subgothica*, Haw., and a very large *Noctua subrosea*, St. Mr. Adkin, specimens of *Hydæcia micacea*, Esp., from W. Meath, similar in depth of colour to *H. petasitis*, Dbl., and also a small *Agrotis saucia*, Hb., having purplish grey primaries and black-outlined stigmata. Mr. Tunaley, a var. of *Lycæna corydon*, Fb., with a wide black border, and another with the black border absent, both from Freshwater; specimens of *Asilus crabroniformis*, L., with *L. icarus* impaled on their lancets; and a series of *L. corydon*, Fb., remarkable for the tendency to angularity in the hind wings, taken at Freshwater; also specimens of *L. bellargus*, Rott., and *L. icarus*, Rott., showing the same tendency, and contributed notes on the peculiarity. Mr. South, specimens of Adipocere of the horse and moth, received from Dr. Knaggs, and read the results of the latter gentleman's experiments. Mr. Winkley, on behalf of Mr. Montgomery, a large number of bred *Colias edusa*, Fb., and communicated a paper on the exhibit.

January 9*th*, 1896.—The President in the chair. Mr. F. Clarke, A.P.S., of Paddington, was elected a member. Mr. Carpenter exhibited a long series of *Colias edusa*, Fb., being a third brood, and bred from ova deposited by a female captured in August, 1895. The last emerged during the third week in November. Mr. Mansbridge, a series of *Hybernia marginaria*, Bork., consisting of the typical London forms, and a long series of melanic and variegated forms from York. A long discussion took place on the occurrence of these melanic forms. Remarks were also made on the various forms of *Gnophos obscurata*, Hb., and it was noted that it invariably assimilated to the colour of its local environment. Mr. Adkin, specimens of very strongly-marked forms of *Hybernia defoliaria*, Clerk., from Sussex. Mr. Mera, a series of *Agriopis aprilina*, L., from Elgin and Sussex. The northern forms possessed very complete bands. Mr. Edwards, *Papilio cenea*, Stoll., and the three forms of its female, viz. *P. cenea*, Stoll., *P. hippocoon*, Fb., and *P. trophonius*, Westw., with intermediate forms; the three species of Danaidæ mimicked by the above, viz. *Amauris echeria*, Stoll., *A. dominicanus*, Trim., and *Danais chrysippus*, L.; the closely-allied species *P. meriones*, male, from Madagascar, and *P. merope*, Doub., male and female, from W. Africa, with *Amauris mavius*, which the latter mimicked; and also *Diadema misippus*, L., and *D. anthedon*, Bdv., which mimics *D. chrysippus* and *A. dominicanus* respectively. Mr. Hy. J. Turner read a paper on the above exhibit, entitled "Mimicry as exemplified by the S. African butterfly *Papilio cenea*, Stoll., its varieties and allied species."—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*November* 19*th*, 1895.—Mr. P. W. Abbott, V.-P., in the chair. The chairman appealed to the members for material, specimens, &c., for a local collection it was proposed to make in connection with the Society, and for which a cabinet had been given by Mr. G. H. Kenrick. He asked chiefly for local species, of which good series were wanted, and asked for them to be carefully labelled. Exhibits:—By Mr. R. C. Bradley, sea-shore Muscidæ: *Actora æstivum* (Barmouth), *Orygma luctuosum* (Barmouth), *Cœlopa eximia* (Nevin, and of Portland), and *C. pilipes* (Barmouth). He called attention to the flat shape of the *Cœlopa*, and remarked that they lived among the stones, and dodged under them when an attempt was made to capture them. By Mr. P. W. Abbott, a pair of *Sphinx pinastri* from Sussex, where he said it had been taken in some numbers recently. By Mr. A. H. Martineau, *Sphinx convolvuli* from Solihull. By Mr. W. Harrison, a series of *Erebia blandina* from Witherslack Moss, and *Macroglossa fuciformis* from New Forest; also larvæ of *Liparis auriflua*, in the small white cocoons in which they undergo hybernation, found under the bark of a willow at Hanbury Park. By Mr. J. W. Smallwood, a number of Lepidoptera taken in S. Derbyshire, including *Acronycta alni*, *Cosmia affinis*, *Cirrhœdia xerampelina*, *Eupithecia valerianata*, *Anticlea rubidata*, and *Trichiura cratægi*. By Mr. C. J. Wainwright, *Asteroscopus sphinx* from Hanbury Park, and a fine dark specimen of *Hibernia defoliaria* from the same place, with an olive shade on its wings. By Mr. R. W. FitzGerald, a number of insects collected by him at Dursley near Gloucester, on the south-west slopes of the Cotswolds; they included *Xanthia aurago* (common, but worn when taken), *Xylocampa lithoriza* (a series on sugar), a long and varied series of *Scopelosoma satellitia*, *Orthosia macilenta; Himera pennaria* (one from a dug pupa), a specimen of *Camptogramma bilineata*, the black markings of which had increased so as to form a well-marked black band on each wing. By Mr. Wainwright, a list of captures made by Mr. C. A. E. Rodgers at Malvern Wells, and remarked upon a resemblance between that insect fauna and that of Dursley on the opposite side of the Severn Valley, amongst other insects taken on both sides being *Procris geryon*, *Xanthia aurago*, *Orthosia macilenta*, &c.; both Mr. Rodgers and Mr. FitzGerald took *O. macilenta* commonly on the hills, and no *O. lota;* while Mr. Rodgers said that on the plains below Malvern the Rev. E. C. Dobrée Fox found *O. lota* plentiful, and no *macilenta*. Mr. R. W. FitzGerald knew, however, of larva of *O. lota* having been taken on the hills.—Colbran J. Wainwright, *Hon. Sec.*

Reading Natural History Society.—A meeting, the first of the winter session, was held on November 7th, 1895. Mr. Hamm exhibited several varieties of British species of Lepidoptera, among which were some exceedingly dark specimens of *Melitæa aurinia*, and one diaphanous example; aberrations of *Lithosia lutarella*, *Thyatira batis*, *Apamea unanimis;* also series of *Sesia sphegiformis*, *Xanthia aurago* (variable), *X. gilvago*, *Dasycampa rubiginea*, *Calymnia pyralina*, *Psyche opacella*, and other species. Mr. W. E. Butler exhibited, among others, varieties of *Smerinthus tiliæ*, *Xanthia gilvago*, *X. aurago*, and a very fine aberration of *Mamestra brassicæ*. Mr. Clarke exhibited a long series of *Zygæna trifolii*, graduated from the typical form to var. *confluens;* a series of *Stauropus fagi*, including black and banded forms; and other interesting species.—Fred. W. Leslie, *Hon. Sec.*

Nonpareil Entomological Society.—Meetings of the above Society were held on October 17th and November 7th. On October 17th, Mr. Jackson (President) exhibited some fine specimens of *Larentia berberata*, *L. flavicincta*, *Hydrœcia nictitans*, *Heliothis dipsaceus*, *Xanthia fulvago*, *Triphæna orbona*, *T. subsequa*, and many other species. Mr. Norman exhibited bred specimens of *Bombyx callunæ*, *Papilio machaon*, *P. podalirius*, *Sphinx pinastri*, *S. ligustri*, &c.; also living larvæ of *Uropteryx sambucata* and *Odonestis potatoria*, and eggs of a third brood of *Arctia caia.* The Hon. Sec. exhibited some specimens of *Arctia caia*, which emerged during the second week of September; also some specimens of *Acidalia incanaria* and *Anarta myrtilli*, taken from Hincheslen during July this year. They appeared to be much larger than the usual form taken near London. Mr. A. Norman showed living examples of *Swammerdamia pyrella*, the pupæ of which were exhibited a few weeks since. He also mentioned that he had a third brood of larvæ of *Arctia caia* feeding.—J. G. Craft, *Assist. Sec.*

RECENT LITERATURE.

The Cambridge Natural History. Vol. V. Insecta, Pt. I. By David Sharp, M.A., M.B., F.R.S., &c. Pp. 83–584. 8vo. Macmillan & Co., London & New York. 1895.

The volume contains a monograph of the genus *Peripatus*, by Adam Sedgwick, M.A., F.R.S., and one on Myriapods, by F. G. Sinclair, M.A., as well as Dr. Sharp's Insecta; but only the latter falls within our province.

In the introduction to his subject, Dr. Sharp gives a comprehensive sketch of the external and internal structure of insects, also of their embryology and metamorphosis, attaching primary importance to the physiological processes of the latter; the external features he regards as being of lesser value. In fact, our author seems throughout to insist that those who wish to understand insect-life scientifically must study their subject from a physiological point of view.

The number of orders recognised are nine. These are—1, Aptera; 2, Orthoptera; 3, Neuroptera; 4, Hymenoptera; 5, Coleoptera; 6, Lepidoptera; 7, Diptera; 8, Thysanoptera; 9, Hemiptera; but only the first four are considered in the present volume. The remainder will form material for a second volume. The arrangement will perhaps be set down as somewhat antiquated by those who accept at once any new scheme that may be presented to them, but our author holds the opinion that the attempts that have been made to increase the number of orders are inadequate, and do not really deal equally with the whole subject. Thysanura and Collembola are treated as suborders of Aptera, but at the same time it is admitted that Collembola has not so far been exhaustively worked out, and that "it is possible that more grounds will be found for separating them as a distinct order from the Thysanura—a course that was advocated by Lubbock—than exists for dividing these latter from Orthoptera proper." Aptera are regarded rather as primitive or little evolved forms than as degenerate insects, and as to their being ancient or ancestral, our author thinks that the reasons put forth for considering them as such are insufficient. The general likeness of Campodea to certain young insects of various kinds is "no more proof of actual ancestry to them than their resemblances *inter se* are proofs of ancestry to one another."

In the chapter on Orthoptera we note, among other important details, some interesting remarks on the recent discoveries about Phyllium (leaf-insects); reference is also made to the term "hypertely," proposed by Brunner to express the idea that mimetic resemblance of the design on wing-covers, as, for example, the imitation of leaf-spots and veinings on the wing-covers of *Pterochroza ocellata*, is more elaborate than mere purposes of utility require.

Chapter XVI. is devoted to a lengthy consideration of the Neuropterous family Termitidæ, and comprises a great deal of information concerning these marvellous insects that will be new to entomologists.

The observations on May-flies are of an exceedingly instructive character, and it is shown how external and internal structures and habits in the various stages of these insects are all correlated.

In the division Hymenoptera only points of general interest and the parasitic groups are dealt with in the present volume; the Aculeata will be considered in the next volume. The phenomena, however, connected with parthenogenesis and production of sex are reviewed, exception being taken to some of the conclusions founded on Dziergon's observations. As regards polymorphism, or castes, in the social Hymenoptera, our author is inclined to accept Herbert Spencer's view that "the sex is determined by degree of nutrition while the egg is being formed," and that the subsequent production of a perfect or imperfect female is dependent upon the nutrition of the larva. The curiously varied conditions of the early life of parasitic Hymenoptera is shown to be accompanied by equally remarkable embryological peculiarities.

We regret that space is not available for a more extended notice of this excellent work, but we can earnestly commend it. It is capitally illustrated, most of the figures being from original drawings; and all the information is thoroughly up to date. There is a growing desire among those who are interested in insects to acquire a general knowledge of orders they do not specially study; this work is the very thing for their purpose.

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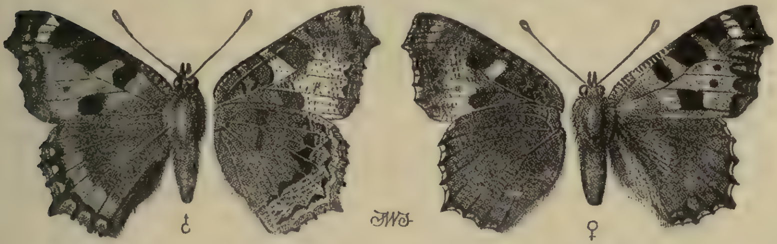
VARIETIES OF *VANESSA URTICÆ.*



The fine aberrations of *V. urticæ* represented by the above figures have been kindly lent to me by Mr. Bright, expressly for figuring in the 'Entomologist.'

In both specimens the primaries bear a close resemblance, both having the second and third black costal blotches almost confluent, the hind-marginal area blurred, and the usual blue markings diminished and greyed; the usual yellow marking separating the first and second costal blotches is replaced by the tawny-orange ground colour in the male; the same marking in the female is also deeper than usual; the male has but one small discal spot. The secondaries in this specimen have a suffusion of dark scales obliterating the usual yellow costal blotch, giving the wings a dullened appearance; the secondaries of the female are wholly blackish, with the merest indication of an orange band, by having that portion of the wing very slightly paler. The blue markings of normal specimens are in this aberration only represented by a single patch of bluish scales at the anal angle. The under surface of both specimens varies much in accordance with the upper surfaces, as will be seen by the figures.

Mr. Bright informs me that the specimens were obtained from the neighbourhood of Darlington.

F. W. Frohawk.

NEW EXPERIMENTS ON THE SEASONAL DIMORPHISM OF LEPIDOPTERA.

By Dr. August Weismann.

(Translated from the German by W. E. Nicholson, F.E.S.)

(Continued from p. 39.)

E. *Details of the Markings of phlœas, independent of Climate.*

1. *The blue spots.* — It has long been known, that many specimens of *phlœas* have bright blue spots on the outer margin of the upper side of the hind wings with the females, indeed, as well as with the males. As many as four can be present, but often one or the other of the spots is only indicated by some scattered blue scales, frequently only by a single one, and not infrequently no trace of the spots is to be seen at all.

Now, if specimens from the south are compared with those from the north, it turns out that well-developed spots occur in individuals everywhere, that indications of them are frequent everywhere, but that no correspondence exists between the climate and the degree of perfection of the blue spots. Some cases are here given by way of illustration.

A. The following specimens in my collection exhibit 3–5 well-developed blue spots:—

1	specimen	from	Lapland.
1	,,	,,	Sardinia, spring brood.
1	,,	,,	Corsica, summer brood.
1	,,	,,	Lindau, summer brood.
3	specimens	,,	Japan, summer brood.
8	,,	,,	Japan, spring brood.
2	,,	,,	Naples, reared at Freiburg at a room temperature.
3	,,	of	pupæ developed at 7–10° C.

B. Slight indications of the spots, *i.e.* they exhibit blue scales in lesser number and more or less scattered:—

1	specimen	from	Lapland.
3	specimens	,,	Sardinia, spring brood.
10	,,	,,	Genoa, summer brood.
3	,,	,,	Greece, summer brood.
2	,,	,,	Berlin.
4	,,	,,	Lindau.
12	,,	,,	Leipzig, pupæ at 27–31° C.
28	,,	,,	Japan, summer brood.
14	,,	,,	Japan, spring brood.
14	,,	,,	Naples, reared at Naples, summer brood.
23	,,	,,	Naples, reared at Freiburg at room temperature.
6	,,	,,	Naples, pupæ developed at 7–10° C.

The largest and most beautiful blue spots are possessed by some Japanese specimens of the summer and spring broods, 1 Sardinian, and 1 Lapland specimen.

C. Without a trace of blue were :—

1 specimen from Genoa (*eleus*).
1 ,, ,, Greece (*eleus*).
3 specimens ,, Lindau, summer brood.
8 ,, ,, Leipzig, kept at 24–30° C.
7 ,, ,, Japan, spring brood.

The blue spots are consequently individual variations, which are formed everywhere and under the most varied temperatures; they often appear only slightly, and still more frequently only suggestively, as single blue scales. It is questionable how they are to be explained; possibly, as vestiges of an early marking, which is in the course of disappearing; possibly, also as a new character asserting itself.

2. *The red band on the under side of the hind wing.*—There are on the grey-brown ground colour of the under side of the hind wing of all specimens of *phlœas*, so far as I have seen, brick-red lines along the outer margin, which are referred to in the books as "confluent reddish lunules." They are also in reality very often distinct as separate "lunules" in cells 1–5, but they are frequently also joined together in a line running in an almost zigzag shape, from which the red spreads inwards to a narrow washed-out band. This red marking varies, but, as it seems, independently of temperature; it is rather local, in such a way, that the individuals of a particular district all present an almost equal development of the same. Thus all my Japanese specimens of the summer brood, 72 specimens, have a broad and vivid brick-red coloured band, in opposition to the specimens of all other countries, with which I can compare. Felder founded, indeed, his *Polyommatus chinensis* on this peculiarity. I have not found this band again in any other colony of the species. Specimens from North Germany always have only a narrow red line or disconnected marginal lunules, which are sometimes strongly, sometimes slightly, brick-red; the Lapland specimens also have these lines very distinct, just as the South German and Berlin specimens, and also most specimens of *eleus* from Greece, Corsica, and Genoa. Sometimes, indeed, the red is very dull; yet I have never entirely missed it. The lunules, which are the feeblest in colour and the most washed-out in marking, are those of my Neapolitan specimens, which were subjected to cold as pupæ, and so far consequently the formation of this character depends upon the temperature, although the washed-out appearance of these lunules is a result of the great humidity in the refrigerator. The marking was washed out in many butterflies

in the refrigerator, not merely in *phlœas*, but also in *Vanessa urticæ* and *levana*, and other pupæ, which had been long in the refrigerator, all frequently produced butterflies with washed-out markings.

3. *The tails of the hind wings.*—A short tail on nervure 2 of the hind wing and a pointed prolongation of the anal angle is given as a character of *eleus*, yet it is not confined to this form, but is also occasionally present in the pure red-gold form, although more rarely. Three grades of the formation of tails can be arranged as well developed, medium, and slight, which occur in my specimens in the following division:—

1. *Captured specimens.*

1. The following specimens had well-developed tails:—

From Lindau, 1 specimen.
,, Freiburg, 1 specimen.
,, Berlin, 1 specimen (*eleus*).
,, Sardinia, 1st brood, 1 specimen.
,, Genoa, 2nd brood, 11 specimens (mostly *eleus*).
,, Greece, 2 specimens (*eleus*).
,, Sicily, 1 specimen (*eleus*).
,, Japan, summer brood; many (accurate figures cannot be given on account of the worn condition of many specimens).

2. The following had medium tails:—

From Lindau, 1 specimen.
,, Freiburg, 1 specimen.
,, Sardinia, 1 specimen, 1st brood.
,, Greece, 1 specimen (*eleus*, ♀).
,, Japan, many of the 2nd brood.
,, Japan, some of the 1st brood.

3. Slight significance of the tail; the following had, respectively, no tail:—

From Lapland, 2 specimens.
,, Sardinia, 2 specimens of the 1st brood.
,, Japan, many specimens of the 1st brood.

One certainly recognizes from these data, that in fact the tail is more often present in the summer brood and in a hot climate, than in the spring brood and in a northern climate; but the experiments above related give a still more decisive conclusion.

2. *Bred specimens.*

1. The Neapolitan specimens reared at Naples exhibited the character in 30 cases well developed, twice to a medium extent, and in no case slightly.

2. The Neapolitan larvæ reared at Freiburg at a room temperature produced 8 well-developed, 13 medium to slight.

3. The Neapolitan pupæ developed at Freiburg in the refrigerator produced 15 specimens with medium to slight tails, and 11 specimens with them entirely wanting.

Consequently the impression of this character appears to be connected with the warmth, which is operating during the pupal development, as it increases in direct proportion with the warmth.

II. Experiments with Pieris napi, 1887.

Five females, taken in the neighbourhood of Freiburg (at St. Peter), laid a number of eggs on *Sisymbrium alliaria*, under a gauze bag, on June 8th, 1887. The emergence of the larvæ followed at 21–22° C. on June 14th, and the larvæ, which fed on *Sisymbrium*, pupated at 21–22·5° C. in a room between June 30th and July 2nd. The pupæ were divided into two lots.

First experiment with napi.—The pupæ at first remained in a room at the summer temperature, 22–25° C., at which the emergence should have followed after 9 days, as was ascertained by experiment with one pupa. In order now to decide, whether the alteration of the summer form into the winter form would still take place, if cold first occurred in the last days of the pupal period, consequently at the time of the formation of colour, 45 pupæ were brought into the refrigerator on July 7th, *i. e.* 6–8 days following pupation. Development was now delayed by the lower temperature, 7–11° C.; but of the 35 butterflies, which emerged between July 13th and 22nd in the refrigerator, 26 were of the pronounced summer form; only 10 exhibited stronger green powdering of the veins below,* yet without possessing the rest of the characters of the winter form, with the exception of the deep black powdering of the bases of the wings on the upper side, which occurred among all the males (6); while the shape of the wings, their larger size, and the white powdering of the abdomen distinguished them as the summer form. Moreover the specimen, which pupated in the room and developed at 22–25° C., possessed an entirely similar mixture of characters.

On July 24th the pupæ which had not yet emerged were brought into the incubator at 29·2° C.; however, only 3 more butterflies of the summer form emerged on the 25th; the rest *first emerged in the following year.* They were hybernated in the cellar, and placed in a room in April. Then 12 more butterflies emerged between April 29th and June 2nd, all of an *exquisite winter form;* all smaller than the specimens of the *same brood*, which had emerged in the year 1887.

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* There was a specimen very similar to this, whose pupa had developed at 25° C.

Second experiment with napi.—A number of the pupæ were placed in the refrigerator at approximately + 9° C. *immediately after pupation.*

A. Four of the same, placed in on June 28th, remained there from June 29th to July 23rd, generally at 9° C.; the temperature, however, fluctuated between 7 and 11° C., but only rarely reached either extreme. None of these pupæ emerged in the refrigerator, although they remained there 24–25 days; and the longest pupal period of the pupæ of lot A, kept in the same refrigerator, amounted to 26 days, the least 11 days, and with the majority less than 20 days. All 4 pupæ were still, on July 23rd, of a beautiful green, as immediately after pupation, *i. e.* the colours of the butterfly were not yet formed. After they had first been brought for some hours into a room at 22° C., and into the incubator at 30–31° C., they developed rapidly, and emerged after 3 days (on July 26th and 27th), all four as *not very sharply defined winter forms* (the powdering of the veins of the under side of the hind wings feebler than usual).

B. Twelve recently-formed pupæ and 2 larvæ, spun up ready for pupation, were placed in the refrigerator on July 2nd, at an average of + 9° C. These also remained unchanged in appearance, partly green, partly straw-yellow, up to July 20th. On Aug. 18th a male emerged as *a decided winter form ;* all the rest of the pupæ hybernated in a cold room, and emerged in the spring of 1888, *all as pronounced winter forms*, viz. :—

2 males on April 3rd.
1 male on April 22nd.
1 male on May 10th.
1 female on May 20th.
1 female on May 23rd.
1 female on May 27th.
2 females on June 2nd.
1 female on June 7th.
1 female on June 26th.

11 butterflies.

Results of the experiments with Pieris napi.—The first experiment shows, in the first place, that low temperature no longer brings about the transformation into the winter form, if the pupæ are first subjected to it a short time before their emergence. But it proves further, what was already known for other seasonally-dimorphic species, through many observers, Edwards, Merrifield, myself, and others, that there are individuals which cannot be forced by heat. A small portion of the pupæ (12 specimens) did not respond to the heat of the incubator, but hybernated, and then produced the winter form.

The second experiment proves once more, that the decision as to whether the butterfly assumes the summer or the winter form, with this species, at least, is determined by the temperature, which influences it *immediately after pupation.* All the pupæ of this lot produced the winter form not so sharply defined, when, after 25 days' cooling in the refrigerator, they were then forced in the incubator, as when they remained until the autumn in the lower temperature and then hybernated in the cold.

Experiments with *Pieris napi* var. *bryoniæ.*

First experiment with bryoniæ.—The excellent entomologist, Pastor Hauri, at Davos, in Les Grisons, had the goodness to send me by post, at Freiburg i. Br., a number of captured females of *bryoniæ.** Several arrived still alive on June 27th, 1887, and were placed under a gauze net on a flowering plant of rape, on which they soon laid numerous eggs. These developed rapidly at 26° C. in the room, and the young larvæ, which were not to be distinguished from ordinary *napi,* fed greedily on rape, and later on on ordinary cabbage. Pupation took place between July 16th and 25th.

As is well known, only one brood of *bryoniæ* flies in the Alps, and it was first to be ascertained, whether in any way the temperature of the lowlands would develope some of the butterflies. Although great heat prevailed during the whole of July and August, and the temperature of the room was generally over 20° C., yet none of the 24 pupæ emerged that summer. They were all hybernated in a cold room, and produced 24 butterflies in the spring of 1888, between April 26th and June 7th, 12 males and 12 females, all completely normal *bryoniæ.*

Second experiment with bryoniæ.—On July 17th, 25 individuals of the same brood as the first experiment, some shortly before, others shortly after, their pupation, were brought into the incubator, the temperature of which fluctuated about 29° C., and never rose above 31·6° C. A male emerged as early as July 17th, coming from the pupæ first brought into the incubator, consequently after only 7 days' rest as a pupa. This butterfly bore the characters of the summer form of *napi;* the green powdering of the veins on the under side of the hind wings is very slight, and so is the black powdering of the bases of the wings above; on the other hand, the apices of the fore wings above are dull and of a washed-out grey, therefore similar to the winter form, and also to the var. *bryoniæ.* The black powdering of the veins towards the margin of the wings, so characteristic of the males of *bryoniæ,* is completely absent. The butterfly is in great contrast to the male *bryoniæ.* As it was the only one of its kind, since no more pupæ emerged in the summer of 1887, but all hybernated, I cannot avoid the suspicion, that an egg of the ordinary *napi* might have possibly been introduced with the food-plant, and invalidated the experiment. Repetitions of the experiment can alone make this certain.

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* I should not neglect to here express my most grateful thanks to the above-named gentleman for the repeated consignments of living females of *bryoniæ,* by which alone I was enabled to set on foot the following breeding experiments.

The rest of the pupæ hybernated in an unheated room, after they had been kept in the incubator until July 30th, and then in a room, and emerged very irregularly in the spring of 1888, between April 6th and June 2nd, 22 specimens in all, 13 females and 9 males. All are completely normal *bryoniæ*, with one single exception.

One female has, indeed, the usual brown-grey ground colour, and also the usual marking of the female of this form, but this colour is broken up or replaced by white in several places on the hind wings, and in a few smaller ones on the fore wings. The butterfly appears speckled and spotted with white, just as if it had been wetted or sprinkled with white, and the blotches of colour had flowed quite irregularly over the surface of the wings, and had covered the brown-grey or dissolved it. I have never seen such a colouring elsewhere, or found it described.

(To be continued.)

THE SYNONYMY OF THE BRITISH BEE HAWK-MOTHS.

By C. W. Dale, F.E.S.

Mr. Kirby is perfectly right in stating that Linné's name of *fuciformis* belongs to the broad-bordered species. I believe all, or nearly all, entomologists held that opinion up to the time of Staudinger and Wocke's Catalogue, and it is well borne out by reference to numerous figures. One exception is that of Moses Harris, who figured *tipulæformis* for *fuciformis*. In my "History of British Hawk Moths" ('British Naturalist'), I have not departed from the old opinion. Scopoli, in 1763, three years before Linné's 12th edition of the 'Systema Naturæ,' gives *Sphinx fuciformis* as "In Lonicera, Scabiosa," confusing the two species. His figure appertains to the narrow-bordered species, but his description apparently belongs to the broad-bordered one. De Villers, in 1789, also says of *fuciformis*, "Hab. in Lonicera, Scabiosa." It will be noted that Linné says, "Habitat in Lonicera" only.

Now, as to *S. tityrus* being the specific name of the narrow-bordered species, I can positively say the case is not proven. Linné, in his 12th edition, gives *tityrus* as a variety of *fuciformis*, and as such we must believe it to be; but as he makes no reference to the wings having a broad or narrow border, and his meagre description is not supported by reference to any figure, we must not jump to a hasty conclusion on presumptive evidence only. Guenée always rejected names given by authors whose figures or descriptions were unsatisfactory.

As Linné bestowed the name of *bombyliformis* on a variety, or only a rubbed specimen of *porcellus*, we have no right to regard it as a rejected specific name, and therefore cannot do better than follow our forefathers in retaining for our narrow-winged species the name *bombyliformis*, given to it by Esper.

If the rule that "a rejected name is not again available in the same genus" is intruded into other orders, it will create no end of confusion.

Glanvilles Wootton, Feb. 1st, 1896.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 57.)

Cleoceris viminalis, *Fb.*—A very local species. "Belfast and Killarney" (*B.*). At Markree Castle, Sligo, I took a short series, with the median band, &c., varying in strength, but the outer portion of the wing banded with silvery white. Clonbrock, Co. Galway: one pale and one of the suffused type are recorded by *R. E. D.*

Miselia oxyacanthæ, *L.*—Abundant in most places, and of the reddish brown type. Var. *capucina*, Mill. Howth, one (*S. R. F.*). Favour Royal, Tyrone, a dark form approaching it.

Agriopis aprilina, *L.*—Often plentiful, but more usually scarce. I have aberrations with a narrow black band from costa to inner margin between the stigmata, and joined to the inferior part of a large black patch outside the reniform. I append a few localities to show general distribution. Co. Dublin and Wicklow, common (Phœnix Park and Powerscourt); near Belfast, ditto; Armagh (*J.*), Tyrone, Monaghan, Cavan, and Westmeath, scarce; Enniskillen, common (*Col. Partridge*); Tullamore, King's Co., Sligo, and Clonbrock, Co. Galway, scarce.

Euplexia lucipara, *L.*—Very common.

Phlogophora meticulosa, *L.*—One of our commonest species.

Aplecta prasina, *Fb.*—Not infrequent in woodland districts. The Irish form is a peculiarly bright and handsome one, of a bright grass-green, with the design well marked and not darkly shaded. Two very handsome specimens from Kenmare have the orbicular, reniform, and an apical blotch and several small traits elsewhere, of a ruddy tint of brown madder. This as well as the green fades somewhat by age. Occasional examples occur approaching var. *pallida*, Tutt. It is a remarkable illustration of the erroneous impression generally held in England of the melanic character of Irish Lepidoptera, that this somewhat variable species, like *A. nebulosa* and *Cleoceris viminalis*, tends in quite the opposite direction. None of the dark green forms not unusual in England occur here, much less the melanic Yorkshire variety, of which I have a series varying from dark greenish brown, traversed by pale basal and ante-marginal lines, with an extra-stigmatal blotch, to one wholly obscured by dark olive-brown, with only a few traces of parts of the basal and ante-marginal lines visible in paler brown tint. This variety is not described in 'British Noctuæ,' and as it is a local form at Wharncliffe deserves the name *eboraci*. Very dark specimens occur also, I believe, at Rotherham, but I think are dark greenish. I have no example of this. I notice this English form as it has a distinct bearing upon the distribution of melanic forms in the British Islands, a question which I propose to refer to again at the close of the Catalogue. Localities:—Howth; Powerscourt, Co. Wicklow (*Greene*); Castle Bellingham, Co. Louth (*Thornhill*); Killynon, Westmeath (*Miss R.*); Farnham, Cavan; Tempo, near Enniskillen (*Langham*); Drumreaske, Monaghan; Favour Royal and Altadiawan, Tyrone, fairly abundant; Markree Castle, Sligo; Castle Taylor, Galway; Castle Townsend, Co. Cork; Kenmare, not scarce; and Killarney.

APLECTA OCCULTA, *L.*—Two Irish specimens have been taken,—one at Knocknarea, Sligo, by Mr. Russ; the other by Mr. Campbell near Derry. Neither of them is in good condition, but their identity is unquestionable. That from Derry is a very pale form, like a grey *A. nebulosa*; the Sligo one is somewhat darker.

APLECTA NEBULOSA, Hufn.—Generally common in woodlands. The form has a very clear white ground, with the markings sometimes but slightly pencilled, but generally very strongly marked. I have seen no examples of the var. *bimaculosa*, Esp., in black, with grey shadings; but Mr. Dillon, of Clonbrock, has specimens of greyer tone than I have yet taken.

APLECTA ADVENA, *Fb.*—Not uncommon at Castle Bellingham, Co. Louth, where Mr. W. B. Thornhill has taken a series during the last three seasons. The typical form.

HADENA ADUSTA, *Esp.*—Very common and widely distributed. The most common Irish form of this species is var. *duplex*, Haw. They vary in tone from brownish black with a purple gloss (which, I presume, suggested the name *adusta*), to the type form of Esper of a rich warm brown, marked with black and paler lines.

About Kenmare I have taken a series of very black specimens, with the markings very obscure; but at Markree Castle, and in Tyrone and elsewhere, the typical form also occurs, but not numerously.

Hadena protea, *Bork.*—Mr. Dillon records the capture of one at Clonbrock, the only Irish example, as Birchall's record of its being found commonly in Wicklow was founded on mistaken information.

Hadena glauca, *Hb.*—The first record of this species was supplied by Mrs. Battersby, of Cromlyn, who took three specimens. It was then taken near Derry by Mr. Campbell and myself. Since then I have found it numerous at Altadiawan, Tyrone; Toberdaly, King's Co.; and Mr. Bristow at Cave Hill, Belfast. Other records are Agher, Meath (*Miss R.*); Markree Castle, Sligo; Howth, one (*G. V. H.*); Enniskillen, one (*Col. Partridge*); and one at Black Rock, a bare rocky islet, some eight miles off the coast of Mayo. Those which I have seen are dark and richly marked, except the specimen of Mr. Campbell's capture, which belongs to var. *lappo*, Dup. Mr. Tutt mentions having received specimens of this variety also from Belfast, where, however, the type form prevails. This moth flies in sunshine to flowers, and I have taken them at those of *Menyanthes trifoliata.*

(To be continued.)

NOTES AND OBSERVATIONS.

On Setting Lepidoptera.—It has often struck me as most unfortunate that a greater uniformity in setting has not yet been attained among entomologists. Everyone must allow that a series of insects well set by one pair of hands looks infinitely better than a series made up of specimens got by exchange from various sources; some of which may be set so low on the pin as to touch the paper, others so high as to be nearly at the top of the pin; while the fore wings of some may be almost in a straight line with each other, and of others so pulled forward as to be nearly at right angles. The object of this paper then is to give some hints which may help young collectors in aiming at greater uniformity, and also to impart some "tips" which I myself have found useful.

The first step towards setting an insect is proper pinning; and this step should never be taken with an insect that is not in a properly relaxed condition. Insects, like all other animals, are liable shortly after death to a peculiar rigidity of the muscles, which is called *rigor mortis*, and those killed with chloroform and the cyanide bottle are especially affected by it. After one or two days in the bottle or in a slightly damp box, this rigidity will be found to have passed off, and the insect will be in a perfectly relaxed state. Until this is the case an insect cannot be pinned and set without difficulty and risk of injury.

Insects killed by being stabbed with a solution of oxalic acid may be pinned and set immediately, before the *rigor* sets in, without fear of their subsequently coming to life again. The process of pinning is the most important point in setting, for if the insect be not properly pinned it cannot possibly be well set. Some collectors do not pay sufficient attention to this point, but seem to think that it is quite sufficient to get the pin through the thorax anyhow. It is absolutely essential that the pin should be inserted exactly in the median line above, and should come out exactly in the median line below. Having settled this, the next thing to consider is the exact point in the median line of the thorax for the insertion of the pin. This should be in a line joining the points of insertion of the primaries; and the point of the pin should come out between the points of insertion of the second and third pair of legs. Many collectors bring it out between the first and second pair, so that when the insect is set the pin is perpendicular. It is much easier, however, to bring the pin out as recommended above, and there is much less risk of rubbing off scales from the wings, especially when the wings are folded over the back of the insect. The height up the pin at which the insect should be set is one over which there is a very great variety of opinion, some collectors liking the wings to touch the paper of the cabinet; while others set them nearly at the top of the pin, almost in the Continental way. A happy medium should, I think, be taken. Insects do not look so well when perched on the top of the pin; but undoubtedly they keep much better for being raised some way above the paper. In the first place, should a mite get in, it is much less likely to do damage if it can only reach an insect by climbing up the pin; and secondly, the free circulation of air under the wings keeps the insect much drier, and much less liable to mildew. With a pin of the right size, exactly half way up is a good rule to follow, and insures all insects set on the same size of pin standing at the same level in the cabinet.

The next thing to settle is the size of the setting-board. The groove must be large enough to take in body and legs easily without any squeezing, and the width of the board should be about one-fifth more than that of the outstretched wings of the insect. It is a good plan to make a hole with a small glass-headed steel pin in the board in exactly the place and in the same direction that you require the pin of the insect to go. By this precaution all risk of bending the pin and perhaps spoiling the insect is avoided. Great care must be taken to get the body at exactly the right level in the groove. If too low, the wings will spring up after removal from the board; if too high, they will droop too much. As soon as the insect is properly pinned on the board, the legs should be attended to: the first pair just resting on the edge of the groove, and the second and third pairs carefully pushed down into the groove alongside of the body. This is very important; for if one of these legs is at all above the edge of the groove, it will interfere with the lay of the secondary wing.

Next the antennæ should be got into position, and, if necessary, held in place by pins. It is a great advantage to make the antennæ lie almost parallel with the costa as it will be when the insect is set Antennæ set in this position are much less liable to be broken, and specimens can be placed much closer together in the series.

The next point is to hold the wings down, so that they may be drawn into their proper position. A small square piece of cork, a pin, and a bristle from a hair-brush, make a capital contrivance for doing this. The bristle may be easily inserted in the proper position by making a hole in the cork first with a needle. For large, stiff-winged insects a fine needle may well be used instead of a bristle. The bristle is passed down between the upright wings, and the pair pressed down till they lie close to the board, but loosely. In this position they can easily be manipulated into place by a needle pushed under the hind margin of the primary, and the secondary can then generally be easily worked into place. When the wings are in position, the cork is pinned tightly down, and the bristle will then hold the wings in their place, and the needles can be removed. The other pair of wings is then got into position in the same manner. Several points have to be considered with regard to the position of the wings. Some collectors seem to think that the costa should be at right angles to the body; whilst others, running to the opposite extreme, set the wings so that the two costas shall form a right angle. Here, again, the happy medium is best. In the former case the secondaries are not properly displayed; in the latter this is done, but their inner margins are drawn too far away from the body. I think a safe rule is to set the primaries at such an angle that while the secondaries are fully displayed, their inner margins shall be parallel with the median line of the body, *while not allowed to touch it.* This precaution is necessary to prevent grease spreading to the wings should the body become greasy some little time before it is noticed. The secondaries should be advanced so far under the primaries as to leave a very small portion of their cilia covered. No young collector can go far astray if he takes as his patterns the figures of the insects as given in Newman's or Barrett's books; and if every collector used such a model, a great step towards uniformity in this point would be gained. A great advantage in using bristles as above described, is that the insect when thus fixed in position can be viewed as a whole, and both sides set at exactly the same angle. When one side is wholly or partially covered by straps, any inequality is much less easily seen. I have found it a great help to getting both sides alike, to have pencil lines ruled across the boards at right angles to their length. It is then very easy to see whether both sides are advanced to exactly the same extent. The next thing is to fasten the wings down so that they shall remain in position till the insect is quite dry. To do this some collectors use narrow bands of card or paper. A broad strip of thin paper large enough to cover the whole of the wings is preferable. It ensures the drying of every part of the wings at the same rate of time; it prevents lines being left on the wings, and it flattens all the cilia and all the scales on the wings. Paper a little thicker than tissue-paper—semi-transparent is good, because it enables one to see if a wing slips at all when the bristle is removed. This paper is easily placed so as to come close to the bristle, and cover nearly the whole of both wings and the antennæ. For all insects under the size of *T. pronuba*, three pins are sufficient. When the paper is firmly pinned down, the bristles are to be removed.

The last thing is, if the groove be large and the body drops, to raise it into the proper position by a pin placed under the body on each side. The insect must be then left until quite set. This may be tested by touching the end of the body with a pin or needle. If this is quite stiff and immovable, the insect may safely be considered set.

To conclude: uniformity in setting among collectors, for their own cabinets at least, is to be obtained:—first, by always pinning in one way; second, by always raising the insect to the same proportional height up the pin, half-way being an easy way of obtaining this regularity; third, by taking an illustrated entomological book as a pattern for the angle of the wings with the body; and fourth, by using the same size of board for insects of the same size.—F. C. Woodforde; January 21st, 1896.

Vanessa urticæ ab.—In looking through my collection of Lepidoptera, I have just come across a specimen of *Vanessa urticæ* labelled: "August 20th, 1892. Castle Hill, W." It measures only a trifle over 1½ in. across the fore wings. Is not this exceptionally small for this species? I well remember taking the specimen, and being surprised upon netting same to find that it was *V. urticæ*. There is nothing very unusual about the coloration. The blue markings are much paler than ordinarily, especially on the fore wings, and instead of being wedge-shaped as usual are kidney-shaped. The two spots near the middle of each fore wing are very small and inconspicuous, and are enclosed in a cream-coloured space, which on the left wing juts out as far as the border. The under side, excepting that it is of a reddish hue, shows no difference from the ordinary marking. I should like to know whether this is an uncommon form of the species—A. E. Allworthy; 61, Lancaster Road, Stroud Green, N., February 9th.

Tenacity of Life in Insects.—In reference to this subject the following notes may be of interest. When I was still new to collecting in South France, I discovered one day, to my great joy, a large female of *Saturnia pyri* hidden away in some bushes. The specimen was the first I had ever caught, and I decided, on account of its large body, to stuff it (a quite unnecessary operation; I have kept dozens since unstuffed). The moth was first killed (apparently) by being forced, with some difficulty, into a cyanide-bottle, where it was left, I should think, about an hour. The abdomen was then emptied (the contents including a large number of ova), and the cavity filled with cotton-wool soaked in a saturated solution of mercuric chloride. The insect, pinned and set, was discovered next day attempting to fly away from the setting-board. In reference to Zygænidæ, a very strong cyanide-bottle kills slowly. Bisulphide of carbon applied with a brush stupifies instantly, but it may be necessary to apply again later to kill effectually. It is unpleasant to use; impossible indoors.—J. C. Warburg; Villa Raphael, Cannes, January 31st, 1896.

Important Sale of British Lepidoptera.—On the 9th and 10th of March next, the collection of Mr. Clarence Fry will be sold by auction at Stevens's, King Street, Covent Garden. I lately had an opportunity of looking through this collection, and it occurred to me that it might be of interest to make a note of some of the rarer species contained therein. In the first place there are several grand examples of the extinct *Chrysophanus dispar;* a few examples of *Sesia andreni-*

formis, taken by the late Mr. Wilkinson on Durdham Down, near Bristol, as they were flying over an old thorn bush; some specimens of *Lasiocampa ilicifolia* from Cannock Chase, 1854; one example of *Hadena satura*, taken by Mr. Osborn on Newmarket Heath; two specimens of *Xylina lambda* var. *zinckenii*, captured by Mr. W. Clare, September, 1877, at Ranworth; one *Catocala electa*, taken by Mr. Vine at Shoreham in 1875; four specimens (one a curious variety) of *Ophiodes lunaris*, all authenticated. There are nice series of *Vanessa antiopa*, *Lycæna acis*, *L. arion*, *Deiopeia pulchella*, *Lælia cænosa*, *Drepana harpagula* (*sicula*), *Dicranura bicuspis*, *Synia musculosa*, *Leucania vitellina*, *Hydrilla palustris*, *Dianthœcia barrettii* (some grand specimens), *Noctua subrosea* (including two bred specimens), *Cucullia gnaphalii*, *Cleora angularia* (*viduaria*), &c. The collection of Tortrices formed by the late Mr. Standish, and bought by Mr. Fry, will also be included in the sale. This collection is of great interest, and includes splendid series of *Peronea*, more especially of *P. cristana* and *P. hastiana*, and a nice series of the rare and local *Eupœcilia gilvicomana*. The cabinet in which these Tortrices are was made by Standish.—Richard South.

CAPTURES AND FIELD REPORTS.

Notes on the Lepidoptera of 1895.—In this neighbourhood one of the most noticeable features in the past entomological season was the scarcity of butterflies; for instance, I only saw a single specimen of *Vanessa io*. Sugaring on the whole was a decided failure. In the early part of March *Phigalia pilosaria* was rather common on tree-trunks. The spring Hyberniidæ were less common, and a full fortnight later than in 1894.

An evening at sallow-blossom on April 20th produced a few *Tæniocampa rubricosa*, *Xylocampa lithoriza*, and *Lobophora lobulata; Cidaria suffumata* and *C. miata* were also taken, the latter at rest, and in excellent condition for an hybernated insect. Some captures at electric light during this month included *Amphidasys prodromaria*, *Biston hirtaria*, and *Tæniocampa gracilis* (2).

During the latter half of May electric light was very attractive, the best things being *Smerinthus ocellatus* (3), *S. populi*, *Callimorpha jacobææ*, *Notodonta dictæa* (3), *N. camelina*, *Dicranura bifida* (2), *Acronycta aceris*, *Tæniocampa rubricosa*, *Hadena adusta*, *H. trifolii*, &c. Sugaring one night only produced a few *Gonoptera libatrix*, *Dipterygia pinastri*, and *Hadena thalassina*. Some of the species netted in the woods included *Ephyra punctaria*, *Phoxopteryx mitterpacheriana* (new to Suffolk list), *Incurvaria musculella*, *Lozotænia musculana*, *Halonota cirsiana*.

During the first part of June I was collecting in North Devon. Being favoured with lovely weather, daytime collecting was profitably pursued. *Pararge egeria*, *Thecla rubi*, *Anthocharis cardamines* (as late as the 7th), and worn *Argynnis selene* were very common; strange to say I have never seen *P. egeria* in Suffolk, though it occurs in the county. Among others taken on the wing were *Chelonia villica*, *Arctia fuliginosa*, and *Heliothis arbuti*. On the 3rd I found a lovely male specimen of *Stauropus fagi* at rest on a conservatory window. A rather curious incident happened on the same evening. Noticing a large moth flitting about among some ivy, I endeavoured to net it, but failed. Subsequently feeling something fluffy in my trowsers pocket, I drew out a specimen of *Odontopera bidentata*, which had wedged itself into the farthest corner, still lively, but with a somewhat shabby appearance. A choice series of *Hypena crassalis* were secured in the woods, together with *Emmelesia decolorata*, *Melanippe ocellata*, and *Eupithecia castigata;* while *Halias prasinana* and larvæ of *Bombyx neustria* were beaten in abundance from oak. In the lanes were taken *Cidaria russata*, *Coremia propugnata* (2), *Emmelesia affinitata*, *E. decolorata*, *Neuronia pulveraria*, *Corycia temerata*, *Melanippe unangulata*, and *Lobophora viretata* (at rest on ash-trunk). At raspberry-blossom were secured *Hadena dentina*. *Habrostola triplasia*, *Apamea basilinea*, *Grammesia trilinea*, and *Xylophasia rurea.* Sugar was tried on the 11th, but the only insect taken was *Thyatira batis.* Whilst sugaring, *Melanippe albicillata*, *Tephrosia crepuscularia*, *Agrotis porphyrea*, and a fine specimen of *Boarmia repandata* (var. *conversaria*) were netted. *Lithosia mesomella* was kicked up on the 12th from a heathy slope, where *Eubolia palumbaria* and *Fidonia atomaria* were abundant and in fine condition. At Clovelly, whilst strolling along the well-known "Hobby-drive," to my surprise a fine *Notodonta trepida*, female, fluttered down to my feet. Whilst beating for Coleoptera at Ipswich, on the 14th, two *Limacodes testudo* (in cop.) fell into the umbrella, with *Adela degeerella* and *A. sulzella.* Electric light yielded *Eupithecia rectangulata*, *Amphidasys betularia* (*doubledayaria*), and *Cidaria dotata.* From a clematis hedge were beaten or taken at dusk *Melanippe procellata*, *Phibalapteryx vitalbata*, *P. tersata*, *Acidalia scutulata*, *Eupithecia subciliata*, *Leucania comma*, *Dianthœcia capsincola.* *Angeronia prunaria*, female, was also taken at dusk; and *Hecatera serena* from a tree-trunk. Sugar in June produced *Mamestra albicolon*, *M. anceps*, and *Miana fasciuncula*, &c.

During July light was very productive, the better species at electric light being *Notodonta dictæoides*, *Liparis salicis*, *Apamea ophiogramma*, *Cleoceris viminalis*, *Plusia pulchrina*, *Pyralis farinalis*, *Tortrix forsterana;* whilst one of the large "hawks" occasionally made a little sport. *Thera firmata* was taken on palings on the 18th. The following species were taken at dusk, &c.:—*Geometra papilionaria*, *Pericallia syringaria*, *Epione apiciaria*, *Iodis vernaria* (2), *Lygdia adustata*, *Coremia quadrifasciaria*, *Macaria notata*, *Thyatira derasa*, *Agrotis corticea*, *Eupithecia corynata*, *E. subciliata*. *Anticlea rubidata*, *Cidaria picata*. *Scopula lutealis*, *Aphomia sociella*, *Xanthosetia zœgana*, and *X. hamana.* From gas-lamps were taken *Eupithecia subfulvata*, *E. centaureata*, *E. sobrinata*, *Nola cucullatella*, and *Herbula cespitalis;* whilst sugar yielded *Acronycta megacephala*, *A. rumicis*, *Cerigo cytherea*, *Noctua brunnea*, *N. baia*, and *Orthosia upsilon.*

During August, in addition to the foregoing species, at sugar, were *Macaria notata*, *Cymatophora diluta*, *Noctua umbrosa*, *N. plecta*, *N. dahlii* (common), *Cosmia affinis*, *Orthosia suspecta*, *Hadena protea*, *Mania maura*, *Crambus pinetellus*, *Tortrix heparana.* Electric light was perhaps more attractive this month than in any other. The species taken included *Notodonta dictæa*, *N. dromedarius*, female, *N. ziczac*, *Ptilodontis palpina*, *Ennomos fuscantaria*, *Triphæna ianthina*, *Charæas graminis*, *Hydrœcia petasitis*, *Agrotis puta*, *Aspilates citraria* Gas-lamps yielded *Eupithecia nanata*, *Acidalia promutata*, *Pelurga comitata*, *Heliophobus popularis*, and *Tethea subtusa.* The following were beaten in the woods:—*Grapholitha nisana*, *Pædisca corticana*, *Teras caudana*, *Peronea favillaceana*, where *Liparis monacha* also was taken from an oak-trunk on the 25th.

On September 7th I took a specimen of *Colias edusa*, male, near Foxhill heath; where also I obtained *Heliophobus popularis* on grass-stems, *Depressaria umbellana* (new to Suffolk), and about twenty larvæ of *Bombyx rubi*. At electric light were taken *Ennomos fuscantaria* and *H. popularis;* and from gas-lamps, *E. fuscantaria, Anchocelis lunosa*, and *Xanthia gilvago*. Insects of a common order came freely to sugar, including *Thera variata, X. gilvago*, and *Orthosia macilenta*.

In October the only things of note were *Polia flavicincta* and *Xylina rhizolitha* from palings.

As November opened with early frosts collecting had to be abandoned, so far as the imago was concerned. On the 17th, however, whilst paying a visit to the woods, I took a few *Hybernia defoliaria*, male and female, and *H. aurantiaria*, male (2), at rest on palings and tree-trunks. On my return in the evening, which turned out to be one of those warm and muggy evenings we so rarely get amid a spell of cold weather, I had the good fortune to take from three gas-lamps, *Himera pennaria, Pœcilocampa populi* (3), and *Petasia cassinea*, which brings to an end the list of a successful season's captures.—Ernest Baylis; Burrell Road, Ipswich.

Stray Notes on the Diurni during 1895. — The majority of the following notes of dates and occurrences were made by myself in the Isle of Wight, where I spent the greater portion of last summer:—

Leucophasia sinapis. This species I sought for in vain in the Isle of Wight during the spring. One specimen was taken at Sidmouth (South Devon) on July 16th, but no more were seen.

Pieris brassicæ. First brood decidedly rare. First appearance, May 22nd, and only three subsequently seen. Second brood (from July 19th) fairly abundant.

P. rapæ. First specimen, April 11th.

P. napi. May 9th, &c. Second brood in by far the greater profusion.

Euchloë cardamines. May 8th to June 21st, common.

Gonopteryx rhamni. This butterfly seems by no means abundant in the island; only a few hybernated, and but two later freshly-emerged specimens came under my notice. There are some fine bushes of *Rhamnus frangula* in Parkhurst Forest, and in some other copses. *R. catharticus* I was unable to find, though its name appears in the island flora; but it can scarcely be common.

Colias edusa. The first specimens seen (hybernated, I presume, though I was unable to net any) appeared early in June; on the 9th several were seen flying hurriedly along the Undercliff. No more were noticed till July 7th, on which day, and the four succeeding ones, a few freshly-emerged examples, mostly males, were captured on the coast of South Devon. From July 29th till early in September (when I feft the Isle of Wight), this butterfly was more or less common all over the island, more being seen on the rough flowery slopes of the Undercliff than elsewhere perhaps; but in the Carisbrooke district it was by no means rare. Owing, I suppose, to the rough windy weather that prevailed early in August, when the greater number were emerging, perfect specimens were rarely obtainable. Two specimens of the variety *helice* were met with, and others were reported. A wasted specimen of *edusa*, accidentally left in a box, was found to have laid a single egg, which hatched on Aug. 22nd; larva pupated Sept. 25th; and the butterfly, a male, emerged Oct. 13th, evidently an example of a second brood of this species. The very early date of the first Devonshire specimens is noteworthy; they were undoubtedly fresh ones, in fact finer specimens than any I subsequently saw.

Argynnis paphia. From July 5th. In the greatest profusion near Sidmouth about the 16th. Common in the Isle of Wight till Aug. 24th.

A. aglaia. By the 27th of June this species was out in abundance on the South Devon coast.

A. adippe. Fairly common between Sidmouth and Honiton on July 17th.

A. euphrosyne. From May 7th till June 11th, very common. On two occasions a female was observed to lay an egg on a leaf of honeysuckle, a spray of which was twisting amongst the violet plants in Parkhurst.

A. selene. Parkhurst Forest; not common.

Melitæa cinxia. This species I found in disappointing scarcity in its haunts on the Undercliff. Two small colonies were observed between Ventnor and Blackgang, and a few odd specimens turned up in other spots. On June 8th most of the specimens seen were worn, though I record one subsequently as late as the 23rd. It seemed a pity to deplete their already scant numbers by netting any, though I am in hopes that the species showed exceptional rarity last year, and may recover somewhat its former abundance. Perhaps the excessively severe frosts of the previous winter were detrimental to the larvæ. At all events, one of the colonies I discovered can hardly have been affected, either by ardent collecting or the spread of cultivation, as it had its headquarters on a very steep cliff, a partial descent of which was not accomplished without caution and difficulty, and where a very free use of the net was impossible.

Vanessa urticæ was abundant throughout last summer.

V. polychloros. Only one hybernated specimen was seen, on May 6th; absence from the island during the time of emergence prevented my seeing the later specimens, but the species was, to my knowledge, taken at Parkhurst. A specimen seen between Sidmouth and Honiton on July 17th is interesting, as the insect seems to be rare in South Devon.

V. atalanta. Hybernated specimens were seen early in June. Fresh examples, from July 5th, abundant throughout the summer; larvæ commonly seen. This species seems undoubtedly capable of producing a second complete brood in dry warm seasons. On Aug. 18th a specimen, in the finest condition, I observed deposit two ova on the top of the youngest leaf of a nettle at Freshwater. On the 23rd these hatched, the larvæ pupated on Sept. 23rd, the butterflies emerging on Oct. 7th, a date on which larvæ that have been obtained at large frequently reach maturity. For the first few days of their lives the larvæ refused even the tenderest nettle-leaves, but descended the petioles, and fed upon the stipules and immature flower panicles. Entomologists possessing a microscope will do well to examine the exquisite egg of this species when obtainable.

V. cardui. Hybernated specimens of this species, from May 31st till the middle of June, were by no means rare, especially on the Undercliff. My expectations of an abundant summer brood were, however, hardly justified, as I record a bare dozen specimens through Aug. and early Sept.

Limenitis sibylla. This species was found commonly in Parkhurst Forest, during the end of June and first half of July. On my return to the island, towards the end of the latter month, only a few wasted specimens were seen.

Arge galathea. Common on the coast east and west of Sidmouth in July, and a stray specimen close to Honiton. A few single specimens in the Isle of Wight at the end of the month.

Satyrus egeria. From April 19th, throughout the season, very common in the island. I think that this species must undoubtedly hybernate, both as larva and pupa. In a wood which I was in the habit of visiting daily, it was noticeable that after the examples of the first spring emergence had become decidedly and pretty uniformly worn, a new supply of what were obviously freshly-disclosed specimens presented themselves towards the end of May.

S. megæra. From May 11th; both broods in abundance. Larvæ from ova laid on Aug. 13th are now hybernating; they have never entirely ceased feeding during the whole of the mild winter which we are at present experiencing.

S. semele. This species was already abundant in South Devon by June 27th. I had not seen it in the Isle of Wight previous to this date, where it abounded later on in the season.

S. ianira. From June 6th. No bleached specimens seen last season.

S. tithonus. From June 27th, in abundance, till Aug. 30th.

S. hyperanthes. From June 30th till Aug. 7th. This butterfly always seems to be for a much shorter time on the wing than any of the other single-brooded Satyrs. This seems rather to point to the probability of the larvæ being more nearly of the same age previous to hybernation.

Cœnonympha pamphilus. First appearance, May 8th.

Thecla rubi. From May 9th (Isle of Wight) till July 11th (S. Devon).

T. quercus. Very abundant at Parkhurst in July and August.

Polyommatus phlœas. From May 9th till Oct. 17th. On Sept. 29th some females were seen, busily engaged in depositing their ova on dwarf plants of *Rumex acetosella.* On examination a profusion of ova were discovered on them. This plant is so hardy, even in severe winters, that probably it affords the most suitable resting-place for the winter larvæ of *P. phlœas,* which hybernate at different ages, and feed in mild weather.

Lycæna ægon. Not observed in the Isle of Wight. By June 29th in abundance on the South Devon coast.

L. agestis. Very few of the first brood seen; the second brood in fair numbers, both in South Devon and Isle of Wight.

L. alexis. From May 12th, in abundance. An interesting variety of the under side of a male was procured near Atherfield, Isle of Wight. In it the normal fawn ground-tint is completely usurped by pure white, the former being restricted to a few slashes along the base of the wing-rays, the spots on the fore wings being prolonged into broad dashes.

L. adonis. Of the first brood of this species I was unable to find any examples, although, wishing to procure some for a friend, special search was made for it, and that in known localities. In August, however, it turned up abundantly, being specially common near Carisbrooke; also being found near Ventnor, near Mottistone, and sparingly on the Freshwater downs.

L. corydon. By July 22nd abundant in the island, often in profusion, till the end of August. The bulk of the males appear before the females are visible. Specimens of the latter, with the spots on the fore wing under side coalescing into horizontal bars, not rare, frequently occurring on one side only.

L. alsus. Sparingly near Carisbrooke and on the Undercliff. Although out on May 27th, I met with a solitary fresh specimen on July 22nd.

L. argiolus. A solitary specimen of the first brood seen, but in the first half of August common, locally, at Carisbrooke; also about the wooded portions of the Undercliff. Eggs and larvæ of this species were found by searching the young umbels of ivy-bloom, and the species successfully reared thereon. Of the resulting pupæ a single specimen (female) emerged on Sept. 30th; the rest are hybernating. It is noteworthy that holly is entirely absent from the locality where the butterflies and ova were found.

Nemeobius lucina. A single specimen was netted on May 10th, in a copse near Parkhurst Forest. Though the weather at the time was perfect, a persistent search failed to reveal any further examples.

Syrichthus alveolus. May 2nd till June 11th.

Thanaos tages. May 6th till June 13th.

Hesperia sylvanus. May 28th till July 23rd.

H. linea. June 30th, S. Devon, and during July in the Isle of Wight.

A feature of last season was the abundance of specimens of the second brood of double-brooded species, as compared with the very sparing numbers that appeared of the first emergence. Possibly the very great severity of the latter part of the previous winter had something to answer for in this, following as it did the exceptionally mild weather that prevailed till just after Christmas, 1894. Doubtless a longer residence in the Isle of Wight, during last autumn, would have revealed some interesting instances of partial double and triple broods amongst species normally single and double-brooded.—R. M. PRIDEAUX; Buckhurst Hill, Essex, Feb., 1896.

MACRO-HETEROCERA IN THE GUILDFORD DISTRICT.—The district is the same as that mentioned in my list of Rhopalocera (Entom. xxviii. 150), but in the present instance I make even less claim to giving a complete list of Macro-Heterocera, as I have not thoroughly worked the district. As a matter of fact, a very large proportion of the species have been taken in my own garden (which is situated close to the town itself, and some distance within the borough boundary); it is neither larger nor more sheltered than the other gardens in the vicinity, and is in no way different, except it receives perhaps rather less attention from a gardener's point of view than some others; but possibly this may be somewhat to the advantage of its entomological fauna. With the single exception of *Sphinx convolvuli*, all the species mentioned were taken or bred by myself. Those taken in the garden are marked with an asterisk.

SPHINGES.—*Sphinx convolvuli.* I have but two specimens of this species. One was sent to me from Bramley (a village about three miles and a half distant), Oct. 15th, 1886; it is not in good condition. The second was taken close to my house, and brought alive by some children, Aug. 20th, 1887; it is in good condition.—*S. ligustri.* A full-fed larva, found Sept. 12th, 1894, from which a fine specimen was bred, June 20th, 1895. Have had several other larvæ before, but failed to obtain imagos. —*Chœrocampa elpenor.* A larva, found Aug. 3rd, 1892, from which a fine imago was bred, May 30th, 1893.—**Smerinthus populi.* Fairly common (chiefly as larvæ) in the garden. I found a much-damaged female there on April 30th, 1893. Obtained about forty ova, nearly all of which proved fertile. The larvæ fed up quickly, and one male emerged July 28th of the same year, the rest of the brood emerging in June and July, 1894. One of the males is very pale, the same colour as the palest female, and with the usual markings rather indistinct.—**S. tiliæ.* Not common. A few larvæ found in the garden at various times; one in Aug. 1885, from which an imago was bred, May 25th, 1886. The larvæ found since have all failed to produce imagos.—**Macroglossa stellatarum.* Two taken in the garden in

Aug. and Oct. 1893; and one or two seen several years before, but not captured.—*M. fuciformis*, L. One specimen taken June 8th, 1892. It was hovering over a patch of *Nepeta glechoma* in a wood; two others seen near the same spot in the following year.—**Sesia tipuliformis*. I have found a few larvæ of this species in an old bush of red currant in the garden, and reared a small number of imagos from them.—*Zygæna filipendulæ*. Fairly common in several places on the downs. Not met with until 1895.

BOMBYCES.—*Hylophila prasinana*. One specimen taken at rest on a park fence, May 21st, 1892.—*Lithosia lurideola*. A few single specimens at various times, but not more than half a dozen in all.—*Euchelia jacobææ*. Larvæ common every year on *Senecio jacobæa*. Have never seen but one imago on the wing. A male bred June, 1892, has the hind wings pink and the crimson markings on the fore wings rather lighter than usual. Is this a common form of variation? The specimen is not crippled in the least. —*Nemeophila russula*. A male taken June 22nd, 1892; others seen at the same time, but not captured.—**Arctia caia*. Fairly common, chiefly as larvæ, but these were much more numerous ten years ago than at present. —*Spilosoma fuliginosa*. A much-worn pair taken *in cop.*, April 8th, 1894; ova obtained, but all proved infertile. Is not the above very early for this species?—**S. lubricipeda*. A few odd specimens at various times; also a few larvæ.—**S. menthastri*. Fairly common.—**Hepialus humuli*. Very common.—**H. lupulinus*. Abundant everywhere.—*H. hectus*. Common in one wood, but not seen elsewhere.—**H. sylvanus*. A few in the garden.— **Porthesia similis*. Two specimens taken in 1886, but not seen since.— **Dasychira pudibunda*. One larva found in the garden, Aug. 15th, 1892. Imago emerged April 28th, 1893.—**Orgyia antiqua*. Very common, chiefly as larvæ.—**Pœcilocampa populi*. One male, Nov. 14th, 1885; and two others in the following year.—*Bombyx neustria*. Larvæ very common in some years. Have not seen more than three or four imagos.—*Odonestis potatoria*. Larvæ fairly common; many imagos bred, but nearly all males. —*Drepana binaria*. One larva found in 1885, and imago bred.—*Cilix glaucata*. Fairly common in most years.—*Dicranura vinula*. Two cocoons found on a sycamore tree, May, 1886. A fine female emerged May 29th; the other pupa died. Have had several larvæ since, but all died.—**Pterostoma palpina*. One larva, Sept. 15th, 1893. Imago emerged May 1st, 1894.—*Lophopteryx camelina*. One taken in 1885. Have had several larvæ since, but failed to obtain imagos.—**Notodonta dictæa*. A few at light in the house. One larva on poplar, June 22nd, 1893. Imago bred Aug. 10th.—**Phalera bucephala*. Very common. Two or three broods of larvæ in the garden every year.—*Thyatira derasa*. A few odd specimens taken among *Rubus idæus*, which is rather common in the district.— W. GROVER; Guildford, Nov. 1895. [To be continued.]

ADDITIONAL NOTES, WITH DATES, FROM READING.—*Hybernia leucophæaria* occurred during a break in the cold weather on Jan. 20th, 1895, from this date hard frost continued till the beginning of March. From March 6th *H. leucophæaria*, *Anisopteryx æscularia*, and *Phigalia pedaria* could be taken commonly till the middle of the month. On the 17th *Asphalia flavicornis* and *Brephos parthenias* were out. By the 22nd *A. flavicornis* was to be obtained in some numbers by searching the tops of low birches. I know no moth more easily seen when resting on young birch. It has no protective resemblance, either in colour or form, to the brown branches and twigs of young growth. I worked from the 5th to the 17th of April for *Endromis versicolor*, but did not repeat my success of the two preceding years. Three females, as already recorded, were taken, two on the 11th and one on the 12th. This species with us makes no headway; it must be put down as one of our rarest insects. *E. versicolor* is holding on precariously; slightly more adverse conditions obtaining, it would as certainly disappear from its Reading station as it did from Tilgate, from well-known causes. *Leucophasia sinapis* appeared on May 4th, was at its height on the 12th, and continued here on the wing till June 3rd, though in West Dorset it lingered on till the 15th. *Stauropus fagi* and *Dasychira pudibunda* were out by May 7th, and *Argynnis euphrosyne* by the 12th. On the 27th *Minoa euphorbiata* and *A. selene* were out and in fine condition, while on the 30th *Bapta taminata, B, temerata, Eupithecia venosata,* and *Anticlea sinuata* appeared. Common spring Noctuæ came freely to sugar on June 1st, and on the 3rd *Epione advenaria, E. plumbeolata, M. euphorbiata,* and *Boarmia consortaria* were to be had more or less plentifully in their special haunts. On the 9th I had the pleasure, with my friends Messrs. Harmer and Holdway, of witnessing the assembling of *Sesia sphegiformis;* on the same date I saw *Thecla rubi* for the last time. On the 10th, with the wind at N.E., a few *Aplecta nebulosa* and *Dipterygia scabriuscula* came to sugar. *Ephyra omicronaria, Abraxas ulmata,* and *Asthena blomeri* were out on the 11th, and *Melanippe hastata* on the 12th. In West Dorset, on the 17th, *Tanagra atrata* was in fine condition, while *Emmelesia affinitata* was worn; by the 20th *A. aglaia* had appeared and *Zygæna trifolii* was flying freely. *Melanargia galatea* first appeared on the 26th, but on this day *Toxocampa pastinum* and *Lycæna minima* were worn. At Reading by July 3rd *T. w-album* had appeared, and *A. blomeri* was still in fine condition. *L. corydon* was out on the 10th. On the 16th *Calymnia pyralina* appeared at sugar; twos and threes of this insect were taken most evenings for the following fortnight. On the 17th *Noctua stigmatica* appeared, and continued on the wing till Aug. 20th. *C. affinis* was out in some numbers, and *C. diffinis* sparingly during the week commencing the 21st. Amongst the junipers *Eupithecia sobrinata* was well out on Aug. 5th, and an occasional *Hesperia comma* was seen. On the 20th *Hadena protea* first visited sugar. The second brood of *A. selene* was out on Sept. 3rd, on the 5th *Xanthia citrago,* the 6th *Asphalia diluta,* and on the 14th the first *X. aurago* was taken. This last insect came to sugar more or less freely till the second week in October. *X. gilvago* appeared in limited numbers during the first three weeks of the month. *Epunda lutulenta* was first taken on the 18th, two or three others being subsequently captured. One *Xylina semibrunnea* was taken on the 28th and a few more were secured during the next ten days. A second brood of *N. stigmatica,* fed up in doors, began to emerge on Dec. 22nd.—J. CLARKE; Reading, Jan. 1896.

LARVÆ OF CHŒROCAMPA PORCELLUS.—In Mr. Theobald's remarks concerning the appearance of Sphingidæ in East Kent (*ante*, p. 65), he states that he failed to find the larvæ of *Chœrocampa porcellus.* Few larvæ that are not internal feeders are harder to find in the daytime. The collector has to encounter two difficulties. The first lies in the nature of the food-plant. On a casual observation, it is not easy to detect where a larva has been at work. Its habit is to strip the spray of bedstraw, leaving the bare stem. If, in a cluster of bedstraw, stems appear thus denuded, the *C. porcellus* larva has been at work. The second difficulty lies in the habits of the larva itself. During the day it hides among the roots of grass and bedstraw, and as close to the ground as possible. Here its sombre colour renders detection difficult. It is possible for the collector to unearth it from its hiding-place, but the prize is scarcely worth the effort entailed. By far the best plan is to mark the spot where the bedstraw has been eaten, and return to it at night. At the end of last July I noticed that several patches of bedstraw (*Galium verum*) were extensively eaten. Feeling sure that *C. porcellus* larvæ were at work, I searched hard, practically on hands and knees, at intervals amounting to about four hours. The result was I secured four nearly full-fed larvæ. Subsequently I visited the same spot with a lantern, at 10 p.m. Then I had no difficulty in securing ten larvæ in as many minutes. On this occasion there was a drizzling rain, which caused the larvæ to have the appearance of so many large snails glistening in the light of the lantern. I feel certain that in most localities where there is an abundance of bedstraw, collectors would find it worth their while to examine likely spots by night.—C. A. E. Rodgers; The Wells House, Malvern Wells.

RECENT LITERATURE.

A Handbook of the British Macro-Lepidoptera. By Bertram Geo. Rye, F.E.S. With Hand-coloured Illustrations by Maud Horman-Fisher. London: Ward & Fowler, 1894–1895. 8vo. Vol. i., Parts I.–IV.

Notwithstanding the number of books published on British Lepidoptera, there seems to be no end to the supply; and Mr. B. G. Rye, one of the sons of the late Mr. E. C. Rye, the well-known Librarian to the Geographical Society, and Editor of the 'Zoological Record,' has commenced a work on somewhat similar lines to that of Mr. C. G. Barrett, but smaller, less elaborate, and less expensive. The introduction relates to metamorphoses and classification, and the portion of the work before us extends to *Argynnis*. There is a useful plate illustrating details and neuration; and the coloured plates are on the whole very good, and include figures of many interesting varieties.

The classification adopted for the butterflies is as follows:—Papilionidæ, Pieridæ, Nymphalidæ, Apaturidæ, Satyridæ, Lycænidæ, Erycinidæ, and Hesperidæ. The position assigned to the Erycinidæ is somewhat unusual; but we think that Mr. Rye has done quite right to treat the Papilionidæ and Pieridæ as families rather than subfamilies, the absence of the internal nervure on the hind wings being so very salient a character in the former. We hope to refer to this book again.

British and European Butterflies and Moths (Macrolepidoptera). By A. W. Kappel, F.L.S., F.E.S. (Assistant Librarian, Linnean Society), and W. Egmont Kirby, L.S.A., Authors of 'Beetles, Butterflies, Moths, and other Insects.' With thirty coloured plates by H. Deuchert and S. Slocombe. London: Ernest Nister. New York: E. P. Dutton & Co. Printed in Bavaria. 4to, pp. 273, double cols.

We have here another popular work on British Macrolepidoptera, which deserves notice for the unusual excellence of the plates (though some figures are slightly above the natural size), and for its including figures of many of the more interesting European species in addition; while the letterpress, which seems to have been carefully compiled, includes full descriptions of all the British and most of the Central European species in addition. The introduction contains the usual information on structure, transformations, collecting, and rearing, and is illustrated by several woodcuts. We notice that this handsome volume is entirely printed, illustrated, and bound in Bavaria; and, although this is accounted for in the present case by its being issued by a German firm, we would ask, how is it that so many coloured illustrations come from Germany? Is the difficulty in the price or the quality of English work?

The Label List of British Lepidoptera. Compiled, after 'A Handbook of British Lepidoptera,' by Edward Meyrick, B.A., F.Z.S., F.E.S., &c. London: Watkins & Doncaster, 36, Strand, W.C. 1890.

When presented in the form of a List, the revolutionary character of the new classification of Lepidoptera, proposed by Mr. Meyrick in his 'Handbook of British Lepidoptera' (noticed Entom. xxviii. 318), stands out with startling prominence. Old familiar tribal headings, such as Sphinges, Bombyces, Noctuæ, and Geometræ, have disappeared, and in their place we have CARADRININA, NOTODONTINA, and LASIOCAMPINA. The species hitherto arranged under the former are curiously divided and redistributed among the latter.

CARADRININA, which is the first division in the new classification, comprises four families, *i.e.* Arctiadæ, Caradrinidæ, Plusiadæ, and Ocneriadæ. The first of these families embraces the Nycteolidæ, Nolidæ, Lithosiidæ, Eucheliidæ, and Cheloniidæ, of the old arrangement. The second consists of the bulk of the old style Noctuæ. The third comprises Gonopteridæ and Plusiidæ, together with the Acontiidæ, and other families of the old style, up to and including the Toxocampidæ, and also the species generally referred to as Deltoids. The fourth includes our old friends the Liparidæ under a new name, and transferred to a new position.

NOTODONTINA, the second division, is made up of the Geometræ, Cymatophoridæ, Sphingidæ, Notodontidæ, and Saturniidæ (old style). The Geometræ are placed in very different sequence to that we have been so long accustomed to; a large number of familiar generic names have disappeared, and many of Hübner's have been introduced.

In the third division—LASIOCAMPINA—we have the Drepanidæ, Endromididæ, and Lasiocampidæ. Then follows PAPILIONINA, the order of families being—Nymphalidæ, Satyridæ, Erycinidæ, Lycænidæ, Pieridæ, Papilionidæ, and Hesperiadæ.

Cossidæ (except *Cossus*, which becomes changed into *Trypanus*, and is the sole representative of a family placed at the end of the TORTRICINA), together with Zygænidæ, Cochliopodidæ, and *Psyche* (old style), comprise the sixth division—PSYCHINA—following PYRALADINA.

The Hepialidæ are grouped with Micropterygidæ in the ninth, and last, division—MICROPTERYGINA.

In many respects this new arrangement is certainly a distinct improvement on the old, but as there are rumours that still other new systems of classification are soon to be introduced to our notice, it may be as well to await these before we decide to rearrange our collections.

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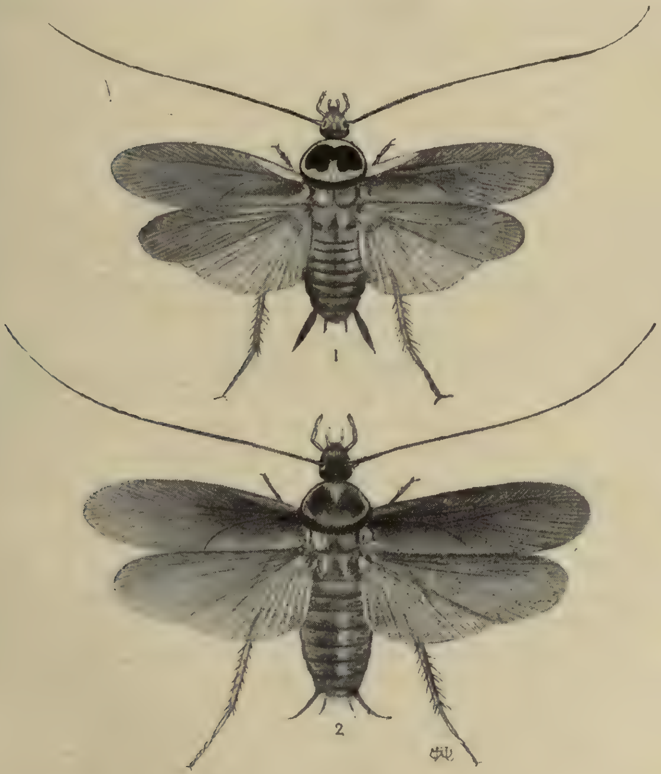
PERIPLANETA AUSTRALASIÆ AND *P. AMERICANA.*



1. *Periplaneta australasiæ.* 2. *P. americana.* (Vide Note, p. 124.)

THE DRAGONFLY SEASON OF 1895.

By W. J. Lucas, B.A.

After the long and severe frost that marked the close of the winter of 1894–5, neuropterists were naturally anxious for the new season to commence in order that they might ascertain how the nymphs had fared during the lengthened spell of arctic weather. Now that the season is over, I think it may safely be said that the unprecedented cold had few ill effects on the odonate branch of the order; for, judging from my own experience, the season of 1895 was on the whole a good one; and yet there must have been many cases in which the smaller ponds, that formed the winter home of various nymphs, were entirely frozen up. But perhaps it is at present almost too early to judge, as, seeing that several species take more than one year to reach maturity, we cannot yet say how the smaller fry may have stood the trying ordeal.

Nymph-hunting, which I pursued on one or two occasions only, produced but a single species, *Libellula quadrimaculata*; but these were to be taken in profusion at the Black Pond, near Esher. Amongst them a friend secured one specimen of *Cordulia ænea*, but did not discover his prize till the imago appeared. I had hoped to take the nymph of *Anax formosus*, but, after searching in the right spot, was only rewarded with empty cases, from which the imagines had fled. Numerous shells of what I felt sure must be *Enallagma cyathigerum* were on one occasion to be seen, though I had not been able to find the lurking-place of the nymphs. Indeed, I should scarcely like to ascribe them to that species had I not found above one case an imago that had but just emerged, and whose wings were not yet expanded. The empty case, however, was so colourless and ethereal, that although, I believe, no figure or description has ever been given of it, I have not yet attempted to make either one or the other, but hope to secure this spring living nymphs for the purpose.

On several occasions I observed females, notably of *L. quadrimaculata*, *C. ænea*, *S. scoticum*, and *S. vulgatum*, while poised upon the wing, ovipositing by dipping the abdomen in the water, and on July 29th placed some eggs of the last in a fish-globe. A number duly hatched out, and by Sept. 6th the nymphs, looking like tiny spiders, were a trifle over 1 mm. in length Their life unfortunately was not a long one, their surrounding probably being unsuitable for them, or their food being insufficient.

A specimen of *Pyrrhosoma minium*, immature, since it had yellow markings, was the first imago to fall to the net, its capture taking place at the Black Pond, near Esher, on May 3rd. This species continued on the wing for about two months, the last specimens being noticed on July 6th. Its congener, *P. tenellum*, a later, smaller, and less common insect, was just coming on the wing at the Pond on June 9th. It was soon out in swarms, and was secured as late as Sept. 10th, three months after its first appearance.

Enallagma cyathigerum was first noticed on May 8th at the Black Pond, and was still on the wing at the same place on Sept. 29th, nearly five months later. How many broods the specimens belonged to, I cannot say. On more than one occasion I came across this dragonfly caught by the round-leaved sundew (*Drosera rotundifolia*). When found the insects were quite alive, although the tentacles on the leaves had closed over and secured the prisoners by the abdomen. With this insect no specimen of *Agrion puella* was taken, though a few were captured at a tiny pond in the same locality. At Wisley Hut Pond, on the other hand, *A. puella* was present in plenty on July 29th, while but one *E. cyathigerum* was taken.

At the Black Pond, on June 4th, a specimen of *Ischnura elegans* was secured, this being a new record for the locality, where, however, I cannot say definitely that I saw another specimen. The species was out in swarms at Wisley Pond on July 29th; and I am also able to record it for Surrey, at Merton, July 7th; on Wimbledon Common, June 30th; and on Chobham Common, June 16th.

One single specimen of *Platychnemis pennipes*, a well-marked female, turned up at the Black Pond on June 9th, furnishing yet another new record for this prolific locality; but this local insect was secured in larger numbers near Ripley on the 23rd, by which date it was going over.

Lestes sponsa I have only taken at Wisley Pond, where, however, on July 29th, with *Ischnura elegans*, it was on the wing in swarms.

Calopteryx splendens is the only other Agrionine dragonfly whose acquaintance I made during the season. It was out in abundance on June 3rd, between Byfleet and Wisley, and on June 23rd, near Ripley. The males varied greatly in the depth of the blue colouring on the wings.

Of the Libelluline dragonflies, the first to appear was *Libellula quadrimaculata*, on May 8th, at the Black Pond. The specimens on that day were mostly pale and limp, and had apparently but just emerged. They were on the wing till July 6th, after which I was able to record no more. But on Sept. 9th I was surprised to see a specimen, which, however, spite of long and patient waiting, was not secured. As I think it was impossible to mistake the species, I am driven to conclude that it was an autumnal appearance due to the lengthened summer weather. The species was also observed near Byfleet and at Wisley Pond on June 3rd, and at Chobham Common on June 16th.

A limp specimen of *Cordulia ænea* was just out at the Black

Pond on May 26th, while it was extremely plentiful at Byfleet on June 3rd, and was on the wing at Wisley Pond the same day. The last specimens I saw were at the Black Pond on June 9th.

But few specimens of *Platetrum depressum* came under my notice last season, but I observed it near Esher on June 2nd, near Byfleet on June 3rd, and near Ripley on June 23rd.

Seven specimens of the none too common species, *Brachytron pratense*, were secured near Byfleet and at Wisley Pond on one occasion only, June 3rd.

Anax formosus, the finest of our dragonflies, first put in an appearance at the Black Pond on June 2nd, but was not secured till the 4th, when three females, two of which fell to the net, were disturbed in dull weather from a small ditch on Esher Common. I last noticed the species on July 6th. In 1895 it was secured more than a month later, on Aug. 10th. Chobham Common is another Surrey locality, where it was on the wing last season on June 16th.

Of the genus *Sympetrum*, the commonest two species, *S. scoticum* and *S. vulgatum*, often crossed my path. The former was first noticed on the wing on July 27th, at the Black Pond, and was still out in good numbers on Sept. 29th. Of the other species, *S. vulgatum*, one was taken near the Black Pond on June 30th, but I did not take another till July 29th. This species also continued on the wing till Sept. 29th.

Three species only of the grand genus *Æschna* fell to my lot last season. *Æ. grandis* was first sighted on June 23rd, and was about in most places I visited till Sept. 10th. *Æ. cyanea* began to appear about July 1st, while my last capture was made on Sept. 15th. I saw one at least, however, as late as Sept. 29th. A much scarcer insect than the two already noticed—*Æ. juncea*—which closely resembles *Æ. cyanea*, but may easily be distinguished from it, amongst other means, by the long pterostigma, was first certainly seen on Aug. 15th in Talbot Woods, near Bournemouth, when, strange to say, a female was taken paired with a male *Æ. cyanea*. A male was secured on Sept. 7th at Wisley Hut Pond, and another on Sept. 9th at the Black Pond, where also others were seen till the end of the month; but so wary were they that no further specimens were secured.

It will be noticed that most of my collecting was done in Surrey. During a visit to Oxford in August I saw, on the 8th, a few specimens of what, I take it, were *S. vulgatum* flying over a pond at Dry Sandford; but besides saw no species except *Æ. cyanea* and *Æ. grandis*, which, however, were plentiful, especially near Bagley Wood. A specimen that I took to belong to the latter species was noticed hunting on Aug. 1st, at 8 p.m. and one on Aug. 8th, at 7.45 a.m.

During a visit to Somerset, from Aug. 26th to Sept. 6th, in which a good deal of ground was covered, dragonflies were noticed on two occasions only. A single *Æ. cyanea* was seen and captured near Sparkford on Aug. 27th, and a small number of *S. vulgatum*, of which one was captured, were found flying on Sept. 2nd over a piece of swampy ground near the coast, a mile or two from Bridport.

21, Knight's Park, Kingston-on-Thames, Feb. 3rd, 1896.

METEOROLOGICAL AND OTHER CONDITIONS INFLUENCING THE APPEARANCE OF MOTHS.

By B. N. Menshootkin.

I SHOULD like to bring forward some notes respecting the question of the nightly appearance of moths, and how it is influenced by meteorological conditions. These conditions can be divided into—(*a*) common, which may be applied to a greater number of species; and (*b*) particular, applying to some, or even only one, species.

The best possible time for moths appearing is, according to observations, a few hours preceding a heavy night thunderstorm. The moths are then literally swarming, and come in hundreds to the sugar. Even rain for a long time does not drive them away; neither do they seem to mind the lightning and thunder.

Warm nights are almost always productive, especially in the spring and early summer; the same can be said if the evening and night are warmer than the day. But towards the middle of the summer warm nights often prove a failure. I attribute this to the fact that moths, as it seems, do not like very dry evenings; and warm nights of the middle and the end of summer are always dry. Neither do they appreciate very wet (but not rainy) evenings; for instance, on evenings with heavy dew, or after a heavy rain, collecting had better be put aside, as no moths appear, with the exception of some mentioned below. But a rainy evening is generally very productive, especially if the temperature is high enough (some 14° to 15° Celsius), and the rain is not falling very fast. Such evenings are sometimes more productive than warm weather. The worst possible evenings I have observed in cases of heavy wet fog, the result of abundant rain during the daytime. Thus it will be seen that wet evenings are not always unproductive, and, provided it rains only a little, and the air is not cold, some nice captures may be effected.

The influence of wind is marked enough, and can be formulated thus: the harder it blows, the fewer are the captures. However, up to a certain degree, the influence of wind may be obviated by putting the sugar on places protected from it. Clear and cloudy nights are also almost always marked: on clear nights it is colder, and the moths therefore fewer; on clear nights, too, the dew is generally very heavy. The opposite can be said about cloudy nights; but cold cloudy nights seldom give good results.

The foregoing is a brief summary of the general rules applicable to most moths. The exceptions are not very numerous: I will only mention a few, just to show the character of them. Thus, *Hadena strigilis* appears invariably in greater force on fair, clear, cold and wet evenings; this moth has, apparently, a great predilection for sugar, and is the first to come to it, sometimes when the sun has not even set. All the different species of *Catocala*, *fraxini*, *nupta*, *pacta*, the rarer *C. sponsa* and *promissa*, and the very rare *C. adultera*, *Amphipyra tragopogonis*, *A. perflua* and *A. pyramidea*, and some of the species of the genus *Cidaria—truncata*, *vespertaria*, and others—prefer cold nights to the warm ones. The genus *Amphipyra* especially likes the wet, cold nights. If this can be explained by the fact that the Noctuæ in question have a thick covering of hair on the body, the explanation is quite inapplicable to *Cidaria*. Then I cannot pass in silence the class of moths which can be called indifferent, that is, appearing every evening and wholly disregarding the condition of weather. As typical specimens of these moths I shall name *Agrotis brunnea* and *A. plecta*.

The other conditions, not relating to weather, may be briefly called: time of appearance, and food.

First of these, time, may be expressed as follows: each moth has a certain hour of the night when it appears on sugar or elsewhere. This time is influenced by meteorological conditions of the night; for instance, it is retarded by cold, dew, or clear sky, and accelerated by clouds or rain.

Food is, I suppose, one of the most important matters to a moth. As a rule, they prefer natural food to sugar; but this is not always the case. A most prominent exception occurs every year with us: it is the blooming of lilacs. Although some moths visit these flowers, the sugar is, at the same time, a very great attraction, as shown by the numbers that come to it; yet the flowers of the lilac contain honey, and by day they are very assiduously visited by bees; even *Macroglossa fuciformis* and *M. bombyliformis* are often seen at them. Quite the opposite occurs every year in July, when the lime-trees are blooming; then not a single moth comes to the treacle, but you can see them flying in the upper regions of lime-trees, quite out of reach even of the longest net.

As regards the kind of treacle for use, I have tried about fifteen different compositions, and I have found that the best is simply a mixture of equal parts of beer and molasses; the addition of rum does not influence the results. The best results are obtained by putting the treacle on tree-trunks with a brush, as in England; the German method—hanging up slices of dried apples covered with treacle—failed absolutely; inferior, also, were the results of my own method—putting the treacle on the leaves of trees; true, the moths were attracted by it in great numbers; but if in taking the first the leaf was set swinging, the others were sure to fly away or fall down before attention could be given to them.

Taking into account the above, it is possible to foretell in some measure the chances of success or failure on a given evening, which in some cases it is important to know beforehand.

St. Petersburg University, Jan. 15th, 1896.

NEW EXPERIMENTS ON THE SEASONAL DIMORPHISM OF LEPIDOPTERA.

By Dr. August Weismann.

(Translated from the German by W. E. Nicholson, F.E.S.)

(Continued from p. 80.)

Third experiment with bryoniæ. — On June 19th, 1888, I again received captured females of *bryoniæ*, despatched by the kindness of Pastor Hauri at Davos, 22 of which arrived alive. From June 25th onwards they laid eggs on rape, and the larvæ emerged between June 26th and July 1st. They were reared on plants kept in water in a room at 17–23° C., and were divided into two lots on July 25th.

Lot I., distinguished as Experiment III. *a*, was left until pupation took place in the breeding-cage at the summer room temperature (always very warm). Pupation took place between July 20th and 28th. Although the room temperature in August was still about 20° C., yet no specimen emerged; all the pupæ were hybernated in a warm room, and produced nine completely normal butterflies in the spring of 1888, 3 males and 6 females, *viz.* 1 male on March 23rd and April 15th and 18th, and 1 female on April 29th and May 25th, and 2 females on May 27th.

Lot II., distinguished as Experiment III. *b*, was taken, on July 25th, 1888, from the room temperature at 23·8° C. into the incubator at 30° C., and remained there until Aug. 19th. Pupation took place about the same time as with lot I., namely, between July 20th and 28th. Although the temperature of the incubator never sank below 25° C., and was generally at 29° C., frequently also 31°, and once 32·8° C., yet no specimen emerged. From Aug. 19th onwards the pupæ were again kept in the room temperature, and during the winter in a cold room.

The emergence of 32 butterflies, 23 males and 9 females, first took place in the spring of 1889, *viz.* :—

6 males and 3 females on May 23rd, 1889.
9 males and 3 females on May 25th, 1889.
7 males and 3 females on May 26th, 1889.
1 male on June 7th, 1889.

These specimens also are all completely normal; some of the females are brighter, others more darkly powdered, but all have the usual yellowish ground colour, such as the specimens captured at large exhibit. There is no difference between the specimens of lots I. and II., and consequently the warmth of the incubator was entirely without influence on all these specimens. *Only one male differed from all the rest*, and he indeed emerged very late, on July 7th; *as this specimen resembles in almost every respect specimens of the summer form of* napi, only the tips of the wings are a little darker than with these.

Fourth experiment with bryoniæ.—In June, 1889, also I received once more a consignment of living females of *bryoniæ*, through the kindness of Pastor Hauri at Davos, and again succeeded in inducing them to lay eggs. The young larvæ began to emerge on June 23rd, and I brought them, on their food-plant, the rape, into the heated incubator, especially constructed for rearing larvæ, at 26–31° C. The rearing was going on satisfactorily; just before pupation, however, the fungoid disease appeared which is often so destructive to our *Pieris* larvæ, and which had already interrupted by its ravages my experiments with *bryoniæ* in the seventies. About 30 larvæ died immediately from it; others, indeed, pupated, but then died. The solitary butterfly which I reared on July 7th almost completely resembled an ordinary summer female of *P. napi* var. *napæ*, and principally differed from that in the tip of the fore wing being grey instead of black, and by the black powdering of the veins 1 to 4 of the hind wing on the under side towards the margin of the wing. The latter occurs otherwise only in the winter brood of *P. napi*, and is especially strongly pronounced with *bryoniæ*.

The fungus epidemic owed, indeed, its destructive power principally to very damp, and at the same time warm, air in the incubator. Unfortunately, I could not repeat the experiment during the year 1889; otherwise I should have tried to reduce the dampness of the air, which cannot be entirely dispensed with, to a minimum; at the same time also to rear the larvæ at the ordinary summer temperature, and to first subject the pupæ or the larvæ about to pupate to the heat of the incubator.

Results of the experiments with bryoniæ.—The results of the experiments here described differ in one point from the experiments described in the year 1871, in so far as that not one of the pupæ then kept at 15–30° C. emerged as *napi;* while in each of the new Experiments, II., III. *b*, and IV., one butterfly was very similar to the summer form of *napi*. Had this case only occurred once, it might have been thought that an egg of *P. napi*, or a quite young larva, had been accidentally introduced into the experiment with the food-plant. I cannot declare it absolutely impossible, notwithstanding careful searchings of the food; but I do consider it very improbable, since the introduction of an egg must have taken place the first day of the rearing, otherwise the larva of *napi* would be far behind the brood of *bryoniæ* in development; but on the first day the quantity of food is so small, that the oversight of an egg or a young larva on it is scarcely conceivable.

But it may yet be added, that one of the pupæ of Experiment II. forced in the incubator exhibited a sprinkling of the wings with white, which may be interpreted as a partial reversion to the *napi*-form. This would contradict my view given in 1871, which regarded the form *bryoniæ* as the original parent form of *napi*. It is obvious that it is a very old form from its wide distribution—in the high Alps and in the far north; but we must, indeed, withhold the final cause, until numerous further extensive experiments are before us. If possible falsification of the experiments is disregarded, the *quite isolated napi*-forms which arose cannot be explained otherwise than by reversion. The white-sprinkled female of *bryoniæ* might be a hermaphrodite, similar to the hermaphrodite bees, in which the male and female characters sometimes appear intermixed in a wild state. Unfortunately this view can no longer be decided by anatomical examination, as the butterfly is dry. But the *napi*-like males might have their origin in an earlier crossing which once took place between a *bryoniæ* female and a *napi* male, and therefore exhibit no variation from *napi*. A mixture of both forms is not entirely impossible, although in general they fly separated both as regards time and place; but there certainly are many places, in which they overlap one another in both aspects.* But if this was the cause of these isolated specimens of *napi* in my experiments, the same would have arisen without the operation of an abnormally high temperature—so it may be thought. The question is obviously not ripe for decision; further experiments with larger numbers of individuals must be undertaken, and attention must be specially directed to this point.

III. EXPERIMENTS WITH VANESSA LEVANA-PRORSA.

Since the publication of a series of experiments with this species in the year 1871, I have again repeatedly experimented with it, whenever the material was available. Before everything the point with me was to test the results I had already obtained by more exhaustive and, where possible, more accurate experiments. After the conclusion of these I first came to regard the seasonal dimorphism of many butterflies, and so also, hypothetically at least, that of *prorsa-levana*, not (as hitherto) as the direct effect of the differences of temperature, but as adaptive-dimorphism, the two schemes of development of which are only connected with different temperatures as the excitants which set them free (Auslösungsreize). If the experiments afford confirmation of this view, they may be regarded as unbiased testimony for the accuracy of it.

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* Thus Meyer-Dürr cites the neighbourhood of Meyringen as a place in which an exactly intermediate form between *napi* and *bryoniæ* occurs.

First experiment with levana, 1883-84.—Numerous (far over 100) eggs and young larvæ of the second brood were collected on Aug. 8th, and reared at the ordinary temperature. Pupation took place at the beginning of September. The pupæ were kept in a heated room, and one *prorsa* emerged there.

From Jan. 10th, 1884, onwards, the pupæ were kept in the incubator over water at 27-30° C. The regulation of the incubator was, however, not quite suitable, and the temperature occasionally rose too high. Many pupæ therefore died, and many butterflies emerged crippled. I bred:—

On Jan.	18th,	5	*levana*	All are without the blue marginal lines of the hind wings.
,,	19th,	6	,,	
,,	20th,	2	,,	
,,	21st,	3	,,	
,,	22nd,	2	,,	
,,	23rd,	3	,,	
,,	24th,	1	*porima*	
,,	25th,	10	*levana*	
,,	26th,	1	,,	
,,	29th,	1	,,	

34 butterflies.

Out of these 34 specimens only 15 were developed quite perfectly; 19 had more or less crumpled and crippled wings, but so that the colour and marking can be recognised. The frequent crippling is doubtless to be referred to the very damp air of the incubator, which moistens the pupal integuments and makes them soft, and thus renders emergence difficult. In order to prevent this, the pupæ were taken out of the incubator on March 1st, and placed in a warm room, which was unheated later on. However, only one more emerged, *viz.*:—

On May 24th, 1 pure *levana* female.

Second experiment with levana, 1884-85.—It should be decided, whether hybernated pupæ can be forced to assume the *prorsa*-form instead of the *levana*-form by artificially withholding their development until the summer, *i.e.* until the normal time of flight of the *prorsa*-form. Pupæ of the second brood of 1884, which had pupated at the end of August and the beginning of September, were therefore hybernated in a cold room, and then, at the beginning of the spring, on March 1st, brought into the refrigerator at + 5° C., and there left until June 27th, when they were brought into a room. There emerged :—

On July 8th, 6 *levana.*
July 10th, 3 *levana.*

Among these there were, however, two specimens, which by the greater extent of the black on the upper side exhibited an approach, though a slight one, to *porima.* The temperature of the room during the development was generally a high summer heat, 22–30° C. ; it was colder on July 2nd only, *viz.* 18·7° C.

Third experiment with levana, 1886.—It was to be ascertained, whether the second brood, which usually hybernates, could be forced by warmth to emerge in a shorter time, and to assume the *prorsa*-form.

Eggs and young larvæ of this brood, collected in the open on July 29th, were reared in the incubator at 30–32° C. Many pupated as soon as Aug. 8th, the others somewhat later. The pupæ remained in the incubator at 30–32° C. There emerged :—

On Aug. 15th, 2 pure *prorsa.*
,, 16th, 2 ,, ,,
,, 17th, 2 ,, ,,
,, 18th, 2 ,, ,,
—
8 pure *prorsa.*

The majority of which, however, were hindered in unfolding their wings by the great humidity, and thereby more or less crippled. In addition, several larvæ had come out of the incubator, and had pupated about the room. These also produced :—

On Aug. 19th, 5 pure *prorsa.*
,, 24th, 1 ,, ,,
,, 26th, 1 ,, ,,

So that consequently 15 *prorsa* were reared altogether.

Unfortunately the further question, whether by a high enough temperature all individuals can be forced to assume the summer form and to emerge forthwith, is not decided in this experiment, as the remaining pupæ (about 50) were dead.

Fourth experiment with levana, 1886. — Eggs and young larvæ of the second brood, found in the open on July 29th, were reared at an ordinary room temperature, and pupated at 21–22° C. between Aug. 17th and 22nd. Out of 241 pupæ there emerged in the same summer, between Aug. 25th and 28th, 5 *prorsa.* The remaining 236 pupæ, as an emergence was no longer to be expected under normal conditions, were divided into two lots in October.

Lot A.—150 pupæ were kept in the incubator at a temperature of about 27° C., which was, as far as possible, constant; there they frequently moved themselves vigorously, which they had never previously done at the room temperature of 13° C. Such movements were observed up to Jan. 14th, 1887, but not later. Up to then no butterfly emerged, and the examination of the pupæ on March 2nd showed that they were all dead and putrid.

Lot B.—86 pupæ were kept over water at the room temperature, which in November, December, and January was not above 13–14° C. There emerged, however:—

On Feb.	16th,	1887,	1 male,	*levana*.
,,	19th,	,,	2 males,	,,
,,	23rd,	,,	1 male,	,,
,,	23rd,	,,	1 female,	,,
,,	24th,	,,	3 males,	,,
,,	28th,	,,	2 males, 1 female,	*levana* (1 crippled).
On March	6th,	,,	2 males, 1 female,	,,
,,	7th,	,,	1 female,	,,
,,	8th,	,,	1 male,	,,
,,	9th,	,,	2 females,	,,
,,	10th,	,,	2 females,	,,
,,	12th,	,,	1 male,	,,
,,	13th,	,,	1 female,	,,
,,	15th,	,,	2 males,	,,
,,	17th,	,,	1 male, 1 female,	,,
,,	20th,	,,	2 females, 1 male,	,,
,,	21st,	,,	1 male,	,,
,,	22nd,	,,	2 males,	,,
,,	25th,	,,	1 male,	,,
On April	4th,	,,	1 male,	,,

34 *levana*, 22 males, 12 females.

Fifth experiment with levana, 1886. — Young larvæ of the second brood, found in the open air on Aug. 16th, were reared in the incubator at 30–31° C.; from Aug. 29th the temperature was kept at 27–28° C. Pupation took place from Aug. 24th onwards. The pupæ remained in the incubator, and there emerged there, from Sept. 1st to 7th, 56 *prorsa* (some of them with a good deal of yellow), but no actual *porima*.

Sixth experiment with levana.—Half-grown larvæ, found on Aug. 16th, were treated in the same way, *i.e.* first kept in the incubator at 30–31° C., and later on at 27–28° C. Pupation took place between Aug. 20th and 27th, and there emerged, between Aug. 30th and Sept. 4th, 14 *prorsa* (three of them with much yellow), but no true *porima*.

Seventh experiment with levana, 1886.—Older larvæ, found on Aug. 16th, were treated as in the fifth and sixth experiments, that is to say, reared in the incubator at 27–31° C. They pupated between Aug. 21st and 23rd. The excessively damp atmosphere of the incubator, which was not constructed quite suitably, unfortunately killed all the pupæ; three larvæ, however, escaped and pupated in the room, and these produced, from Sept. 6th to 10th, three *prorsa*, with little yellow.

Digest and conclusion of the levana experiments 5, 6, *and* 7.—73 *prorsa* butterflies were bred in consequence of rearing larvæ of the third brood in the incubator. In the fifth and sixth experiments the pupæ kept alive without emerging. These were kept through the winter at a room temperature of 13–14° C., and produced :—

On Feb. 9th,	1887,	2	*levana*	males.
,, 10th,	,,	1	,,	female.
,, 16th,	,,	1	,,	female.
,, 28th,	,,	3	,,	
On March 1st,	,,	1	,,	male.
		—		
		8 *levana*.		

Results of the levana experiments. — All the experiments newly described here relate to the *third brood of the butterfly*, i.e. to the brood of the summer generation, or the second brood of the year, which usually hybernates and produces the "winter form" *levana* in the spring. The species is double-brooded with us, and the larvæ of the late summer brood usually forms the first brood of the butterfly of the following year. My experiments of the year 1869 have shown that very occasionally in very hot summers this late summer brood of larvæ manages to pupate and emerge, and, in Southern Germany, at least, to lay eggs, although it has not been proved by them that these eggs can develop to pupation; so that a complete third brood can be interpolated in the cycle of the species.

The experiments then carried out appear to me to prove, that the *prorsa*-form can well be changed into the *levana*-form, if the pupæ are brought into the cold; but, on the other hand, that application of heat to the pupæ does not succeed in altering the *levana* brood into the *prorsa*-form. I thereupon concluded, that the *levana*-form was the older, the *prorsa*-form the younger. At that time I was working at heredity with conceptions that were not yet very clear, and thought "reversion" to the parent form might, indeed, be possible, but reversion from the parent form to the phyletically younger form is not conceivable. A theory of heredity was then wanting, to which such facts could be referred and subsumed under general propositions. To-day, where I assume different rudiments to each of the two forms of the butterfly in the germ of the individual, I should no longer have fallen into this confusion. Then I pictured to myself a cycle in such a way, that one and the same germ-substance was so governed, that it must one time produce *levana*, and the second time *prorsa*, then again *levana* and again *prorsa*. To-day I imagine two kinds of rudiments in the germ near one another, one of which is enabled to develope by heat and the other by cold. Now it is no longer a difficulty, that, according to circumstances, from one brood of *prorsa* yet another brood of *prorsa* follows, as I already had shown, that by the influence of cold upon the pupæ, one brood of *levana* could be followed by a second brood of *levana*. In my view, the conception of "reversion" no longer in general plays any part in these phenomena, but only that of the activity of one rudiment or the other.

The facts harmonise very well with this view of cyclic heredity, although they also show, that the phenomena are not quite so simple, as might be expected from it. This depends upon the fact, that the temperature is not the only excitant, but that rather some other co-operates with it: the tendency to alternation.

For the rest, I had already been able, from my old experiments with *levana*, to draw the conclusion that the change of form is a relatively free one, as in one of the same (Experiment 6) I succeeded in getting a female of the summer form *prorsa* to reproduce, and indeed, in the hot summer of 1869, very early indeed—on July 4th. The butterflies (18 specimens) developed from the eggs after 30–31 days, and these were all the *prorsa*-form. One of my critics rightly cited this against me at the time.

It is obvious, from the experiments now set forth, that in fact the third broods can be induced by heat to assume the *prorsa*-form, at least in part; indeed, that an especially high temperature is not always necessary for isolated *prorsa*-forms to arise. This is proved by:—

The first experiment, in which, from about 60 pupæ of the third brood, which had pupated at the beginning of September at the usual temperature of a warm room, one *prorsa*, at least, still developed.

The third experiment, in which, from numerous specimens, which pupated in August (consequently very early), 15 *prorsa* butterflies emerged up to the end of August.

The fourth experiment, in which, from 241 pupæ of the third brood, five *prorsa* emerged at the end of August at the usual room temperature.

The fifth experiment, in which, from pupæ of the third brood, 56 *prorsa* butterflies emerged at the incubator temperature of 27–28° C. at the beginning of September.

The sixth experiment, in which, from pupæ of the third brood at 27–28° C., 14 *prorsa* emerged.

The seventh experiment, in which, from pupæ of the third brood at the room temperature, three *prorsa* emerged at the beginning of September.

But one dare not assume from these experiments that every pupa of the third brood assumes the *prorsa*-form, in case it is brought into a high temperature on its pupation. The following facts speak to the contrary:—

In the first experiment only one *prorsa* emerged from about 60 pupæ, which were all kept at the same temperature, *i.e.* in a warmed room. In the third experiment only eight *prorsa* emerged in the incubator out of 65 pupæ, but there were besides seven *prorsa* of the same brood, which had pupated in the room. In the fourth experiment I bred five *prorsa* butterflies out of 241 pupæ at the ordinary temperature at the end of August; all the rest hybernated.

These facts admit of no other explanation, as it appears to me, than the assumption, that *the tendency of the pupæ to the development of the* prorsa-*form is of different strength with the different individuals* of this third brood. It might be objected to this conclusion, that the temperature of the incubator was fluctuating, and that the different individuals might have been subjected to unequal temperatures just at that period of development in which the decision is given, whether the *prorsa* or *levana* rudiment is to be active. On the other hand, it is proved by Experiments 5 and 6, in both of which the temperature only fluctuated very slightly, and in which it is equally certain, that the critical time of this high temperature was struck while the larvæ had been reared in the heat, and pupation took place in the incubator itself. Yet in both experiments together 35 pupæ hybernated uninfluenced by the heat, and eight of them produced the *levana*-form in the spring.

This conclusion of the different individual tendency towards the assumption of the summer form might be contrasted with my experiment of the year 1869; since then all the pupæ of the third brood assumed the summer form under the influence of the exceptionally hot July sun. But first there were only 18 specimens; secondly, there were five *porima* among them, *i.e.* intermediate forms between *levana* and *prorsa*; and thirdly, it is still indeed dependent on the strength and duration of the warmth excitant whether the *prorsa* rudiment is active; and it is conceivable that, with very great heat, such as then prevailed, this is always the case. Such a high temperature as a hot summer brings about in the open, cannot be produced artificially, without running the risk of destroying the pupæ by an atmosphere which is too dry or too damp, or by the prevalence of vegetable parasites. After all it is never to be forgotten that we cannot produce the *natural* conditions artificially in the incubator; the change between day and night temperature is not to be closely imitated, and still less the wind, &c., or indeed the direct rays of the sun, which also come into consideration.

I consequently believe we may assume, that in fact the third brood of *levana-prorsa*, as a general rule, has the tendency to longer pupal rest (*i. e.* to hybernation), and with it to the *levana*-form; but that this is not the case with all the brood, single individuals in many broods being constantly present, which, on the other hand, bear in themselves the tendency to rapid development and to the assumption of the *prorsa*-form. These are the individuals which still produce *prorsa* butterflies at a medium temperature (at about 13–18° C.) in September or October. But manifestly we must conclude, that a larger number of pupæ of this third brood is altered by the higher temperature, and may be induced to develop forthwith under the assumption of the *prorsa*-form. Whether there are also such individuals, which are in no way to be induced to this, must for the present remain undecided; the five *porima* specimens of the experiment of 1869 prove that with many it only takes place with great difficulty, as in these both germ-rudiments (Keimesanlagen), the *prorsa* and the *levana* rudiment, have worked together.

But such a co-operation can, as the experiments teach us, take place in yet another way. In the first place it is significant, that specimens of *porima* sometimes occur also in the open, and, indeed, in the summer. If I am not mistaken, they can be brought about in two ways: either as in the experiment of 1869, *i.e.* by the fact that an unusually hot summer allowed the third brood to begin very early (commencement of July), so that their pupæ fell under the influence of the greatest summer heat. In this case those individuals will become *porima*, in which the tendency to *levana* is overcome by the heat with most difficulty. But the *porima*-form can, indeed, arise in yet another way—in which they were first artificially produced by Dorfmeister, and later on by myself, namely, by the action of a lower temperature on the second brood. In this a preponderance of the tendency to the *prorsa*-form will have to be assumed, but one which can be more or less completely overcome by the fact that a low temperature is acting at the critical time, *i.e.* immediately after pupation.

It seems obvious from the experiments, that a certain influence can still be always exercised by temperature on the colouring of the butterfly, even in the later period of the development of the pupa. Experiment 2 shows, at least, that pupæ of the third brood of the end of August and beginning of September, which not only spent the winter in the cold, but were also prevented from further development the whole of the spring by means of cold, produced, indeed, the *levana*-form in

July, but yet in some specimens with a slight approach to *porima*. At all events, a high temperature itself has, as a rule, very little effect on pupæ of the third brood, which have once been exposed to it for some weeks without developing. They all produce the *levana*-form, although frequently tending somewhat towards *porima*; in this way the 34 butterflies of Experiment 1 emerged, which were forced by heat as soon as the end of January.

Viewed apart from any theory, the facts, shortly put together, are the following: *levana* and *prorsa* follow one another in the open with us in a regular cycle in such a way that, as has been known for a long time, *levana* occurs in April, *prorsa* in June. By the influence of cold immediately after pupation the second brood may be induced to assume more or less the form of the first, *i.e.* the *levana*-form; but the tendency to the *prorsa*-form is stronger in this brood, and it does not succeed in making every individual *levana*. On the other hand, the third brood has, in the greater number of individuals, a strong tendency towards hybernation and to the *levana*-form. But there are single individuals, which form *prorsa* at once without the influence of a higher temperature, and the majority of the rest can be induced to become more or less pure *prorsa* by the influence of a high temperature on the fresh pupæ. Intermediate forms, so called *porima*, arise, wherever a brood is affected by an unsuitable temperature at the beginning of its pupal period; thus with the second brood by unusual cold, with the third by unusual heat.

I shall speak of the theoretic significance of these facts in the general part.

(To be continued.)

PLUSIA FESTUCÆ AND ITS SECOND BROOD.

By J. Arkle.

On a hot sunny afternoon, May 6th, 1893, whilst watching a number of dragonflies (*Ischnura elegans*) flying about or resting upon the sedge *Glyceria aquatica*, my attention was arrested by a small hammock of white silk slung up near the bent top of a sedge leaf. I had never seen such a thing before, but I felt sure it was a cocoon of *P. festucæ*. And so it was. The dragonflies were left to themselves, and at the end of a close search I had taken six pupæ. The moths all emerged between June 5th and 10th.

Although I kept a sharp look on the place, I saw no further trace of the insect until Aug. 3rd, when I found seven pupæ spun up about twenty yards from where I took the first. Three moths emerged on the 7th, two on the 16th, and another on the 18th.

The seventh pupa died. Newman states that the chrysalis occurs in August. Stainton gives August and September as the months for the imago.

May, 1894, was cold, wet, with little sunshine, and frosty towards the end of the month. It was June 6th before I saw *P. festucæ.* On that day I found a larva spinning up at the old place on an iris leaf. On the 13th I took six pupæ, and on the 20th one. The first emergence occurred on the 29th, three more July 1st, and the eighth on July 5th. The second brood of this year had spun up by Aug. 18th, when I found three cocoons on the mace or branched bur-reed (*Sparganium ramosum*). On the 24th I took three more cocoons from the same species of sedge. On the 27th I found two pupæ, and a caterpillar in the act of spinning its cocoon. One of these pupæ was upon *S. ramosum*, and the caterpillar on *G. aquatica.* I gave away all this second brood, with the exception of two pupæ I reserved as tests. The first of the two produced a moth Aug. 29th, the second on Sept. 1st; and those sent away gave a satisfactory account of themselves about the same time.

January and February, 1895, are still remembered for their intense frosts. On Feb. 10th I happened to be near the *festucæ* pond, and went a little out of my way to see how it looked. It was obliterated. Instead was a large sheet of ice stretching well on to a quarter of a mile. The greater included the less. A lot of people were sliding and skating on its surface. A waterhen's nest, which I had previously noticed, had disappeared, in what, I was told, had been an exceptional flood.

It was near the end of April before the waters had retreated and left the pond at its normal size. Then came the wonder as to whether I should find the first brood of *P. festucæ.* I searched again and again, but without success. Pupæ were found at other spots in the district, and the question now was how long it would be before a moth visited the old pond again. I had not long to wait. On Aug. 7th I took three pupæ, and two larvæ spinning up; on the 9th, two more larvæ just beginning their cocoons; another pupa on Aug. 15th—all on *S. ramosum.* On the 20th the first moth appeared, and on the same day I discovered a pupa on iris. The last moth emerged from its cocoon on Sept. 7th.

To get a connected series of tests I have referred only to observations relative to this particular pond. I have never been able to find the caterpillar except when making its cocoon, and I have never seen the perfect insect anywhere out of doors, except on one occasion. The chrysalis is black.

The foregoing facts prove *P. festucæ* to be double-brooded in the Chester district; and I am able to show, through the kind favour of Mr. J. Collins, that this feature in the life-history of the insect is maintained as far north as Warrington. Mr.

Collins's note to me on the subject is so interesting that I avail myself of the privilege of giving it *in extenso*. He says:—"We *do* take the second brood of *Plusia festucæ* at Warrington, as well as the first one. In June last I found about half a dozen webs containing pupæ, and have long since [his letter is dated Sept. 2nd, 1894] bred the moths from these, of course. I have not had the time to search for the second brood, last August, or even up to date, as I am aware it is not yet too late to go for it. Like you, I take mine on the great sedge, bur-reeds, also on a coarse ribbon-grass, and have actually found them feeding on water plantain (*Alisma plantago*), but never on yellow iris. I have found cocoons repeatedly on water plantain, and on the coarse grass referred to, growing in the middle and along the sides of a little brooklet near Warrington. By the way, when the cocoon is spun on the grass it is bad to detect. From the nature of the locality we always fancy a dry season like last year essential to their welfare; for in the wet seasons the streams rise, overflow the banks, wash down the plants, and consequently swill off and drown the larvæ. However, yours may be obtained from ponds where they would be less exposed to drowning, from there being no current to bring down the plants. We always find in a wet season that *P. festucæ* is much scarcer than in a dry one. I have for many years netted the June brood over campion and bramble flowers."

Following an observation of mine upon the habits of the moth (Entom. xxvii. 243), Mr. J. E. R. Allen, of Bolton, contributes (p. 270) an interesting note on the appearance of the insect in Galway. There, in 1893, he took an imago May 28th, and another on Sept. 20th. Obviously these were representatives of first and second broods.

Let us now consider the evidence which points to the limit of the moth, at any rate in one locality, to a single brood. Mr. Allen, in the note referred to, says:—"This moth seems to vary in its economy in different localities. At Bolton, where I have taken it for many years, half-grown larvæ are found in April, and full-grown larvæ up to the middle of June; the food-plant is almost always the yellow iris. The pupa is generally in a bend of the iris leaf, about two inches from the point, and the moths begin to emerge at the end of June. I do not think a second brood occurs at Bolton; I and others have looked for it in vain." Mr. Rushton, of Thornbank, near Bolton, in a letter to me dated Aug. 30th, 1894, says:—"I am sorry to say that I know very little of the life-history of *P. festucæ*. I had three pupæ. Two emerged on July 4th, and the other on July 5th." Mr. Rushton, in another letter dated Sept. 3rd, supplies me with a note by Mr. J. Grime, of Bolton. Mr. Grime says:—"*P. festucæ* occurs in three localities about Bolton. In forward seasons I have found the chrysalis by May 18th, but never earlier. It is in the chrysalis state about four or five weeks, and I believe the young larvæ hybernate. Although I have searched repeatedly for a second brood, I have never found one."

We have now got from Chester to Warrington, twenty miles, roughly speaking, and north-east. From Warrington to Bolton is another twenty miles, measuring by the same standard of accuracy. Here, although search has been made for years, and by careful entomologists, the late brood has never yet been found. Let us continue our trip some forty miles to the north-west, and we find Mr. G. T. Porritt at Morecambe from Aug. 11th to Aug. 31st, 1893. In Ent. Mo. Mag. for January, 1894 (p. 12), we find Mr. Porritt writing as follows:—"At dusk *P. festucæ* occurred on all the ditches (Heysham Moss), and was not uncommon." What, then, was *P. festucæ* doing at Bolton at the same time—forty miles to the south? It was either on the wing as well, as a second brood, or the progeny of the *only brood* (June–July) were about to hybernate as eggs or larvæ. The first of the three probabilities must be dismissed in the face of evidence which cannot be set aside, and either the second or third brings the Bolton form up to the importance of a variety. As far as coloration is concerned, variation of the moth is hardly perceptible. The Chester insect, I think, is a little darker than the Bolton one. The "gold spots" vary a little in shape, size, and proximity in all localities, but I can meet with no confirmation of a reputed form with confluent spots.

Chester, Dec. 28th, 1895.

IRRORHOTIDES: A NEW GENUS OF ATEUCHIDÆ, WITH A DESCRIPTION OF A NEW SPECIES.

By John W. Shipp.

Irrorhotides, n. g.

Body similar to *Actinophorus.* Thorax and head resembling *Pachysoma.* Fore legs similar to *Sebasteos.* Head not free; clypeus 6-dentate, the two centre teeth projecting. Thorax wider than the elytra, compressed transversely, with the lateral margins strongly curved and crenulate, wider in the centre, narrower at the anterior and posterior angles: apical margin smooth; posterior margin finely crenulate, with a concave curve, and slightly sinuated, posterior angles not so wide as the anterior angles, acute, and terminating in a small tubercle or spine. Elytra cordiform, slightly convex, as wide as long, humeral angles acute; lateral margins curved towards apex, strongly emarginate; basal emargination crenulate. Pygidium obtusely triangular. Anterior tibiæ flat, elongate, 4-dentate on exterior margin, curved inwards at extremity, with four small equidistant points or tubercles on the inner margin. Femora of a uniform thickness, and not perceptibly thickened towards base. Intermediate femora thickened in the centre; tibiæ short, terminated in a sharp curved spine. Posterior femora thickened in the centre; tibiæ rather long, narrow, and slender, more or less three-sided, obliquely truncate at apex, terminating in a sharp curved spur. Tarsi similar to *Actinophorus*. Prosternal keel ending in an obtuse point; sternum with a deep sharply defined depression down the whole length from the prosternal keel.

FRYII, n. sp.

Colour dull black. Head wider than long, 6-dentate, with the two centre teeth prominent, and the indentation circular; the remaining teeth are almost obsolete. Clypeus smooth, slightly curved upwards in front, covered with very small and fine punctures; occipital ridges very small, and not produced towards the centre of the head; margins smooth. Antennæ black, club greyish. Thorax slightly convex, shining, thickly punctured with fine punctures and small granules. The posterior margin is curved inwards towards the disc, emarginate, and finely but closely crenulate; lateral margins produced to the centre, with a number of long porrect reddish-brown hairs on posterior portion. Scutellum obsolete. Elytra slightly duller, with six striæ on each elytron; interstices rugose and covered with some large irregular shallow punctures, which get more shallow and smaller towards apex. Suture very distinct, smooth, shining, and impunctate. Abdomen smooth, shining; prosternal keel shining and finely punctured on sides, smooth on disc. Pygidium dull, slightly granulate. Anterior tibiæ quadridentate on exterior margin, with the apex thickened laterally at tip, and terminating in a sharp fine spine; the apex is curved inwards into a large obtuse tooth. Inner margin with a number of long reddish-brown hairs, and a small tuft of hairs on the centre of the under side of the femur, and another small tuft at the apex, on the upper side. Intermediate and hind tibiæ covered with thick reddish-brown hairs; femur and sides of abdomen pubescent. Tarsi verticillated. L. c. 25 mm.

Hab. Port Nolluth, S. Africa. (Type in coll. A. Fry.)

I have to thank Mr. A. Fry for the loan of the above interesting and unique Ateuchid. The peculiar form of the thorax will serve to distinguish it from its other allies. The form of the anterior legs is very similar to *Sebasteos*, Westw., and the cordate form of the abdomen places it after *Actinophorus*, Creutz, and *Sebasteos*, Westw. It seems a link, too, between the Ateuchites (proper) and the Old World genera of *Eucranides—Mnematium*, McLeay, and *Pachysoma*, McLeay.

Oxford, 1895.

COLLECTING IN NEW ENGLAND.

By W. F. Fiske.

In Southern New Hampshire the first insects begin to awake from their long winter nap on the warm days of the latter part of March. At that time the best locality for the entomologist is the Maple-sugar camp. Here on warm days, when the sap runs well, *Grapta j-album* and *Vanessa antiopa* may be seen flitting around the tops of the trees, and sipping the sweet sap from the wounds made by the squirrels. After dusk several species of moths may be taken, and in the morning a visit to the buckets will disclose many which have fallen into the sap collected there, the rarest of which are worth the trouble of rescuing and drying.

In April the first of the moths begin to emerge from hybernating pupæ; a few Bombyces, Geometridæ, and Micros, but mostly Noctuids. *Brephos infans*, a small but bright-coloured under wing, appears about waste land by April 10th. Although several species of hybernating butterflies have been more or less common during the first part of the month, the first species to begin to emerge from the pupa are a few *Lycæna* and *Thecla* about the 20th The dense clumps of cassandra or meadow fern in the swamps are in blossom at this time, and are literally alive with insect life. *Pieris rapæ*, which was introduced from Europe about thirty years ago, and the native species *P. napi* var. *oleracea*, formerly common but now very rare, appear soon after. *Colias philodice* may be noticed the last of the month. It is the only *Colias* native here, but the lack in variety is more than made up by quantity, it being very abundant.

Business in the world of Lepidoptera is not very brisk, however, until the middle of May, when nature seems to awake to the fact that June is almost at hand. The lilacs are in blossom now, and the blossoms are frequented during the day by many dusty friends. The three swallow-tails—*Papilio turnus*, resembling *P. podalirius; P. asterias*, the "carrot-worm," black, with yellow and blue spots; and *P. troilus*, black, with greenish white and orange spots—are very conspicuous. Several species of humming-bird moths are common during the day, and the humming-bird itself arrives, looking like a magnified specimen of *Sphinx*, and which may even be taken in a net. Two small species of *Argynnis*—the first, *myrina*, with silver spots on the under side; and the other, *bellona*, without—are very common on low lands the last of the month. Another small butterfly, *Phyciodes* (*Melitæa*) *tharos*, appears, and will continue with us all the summer. The skippers, which are in this section conspicuous for their numbers and variety, begin to appear the latter part of the month. One species, *Pamphila metea*, is quite common about the 20th around very dry sandy places, and is the only one which may be taken in May and not in June. The night-flyers during May are numerous, mostly Noctuids, but a good many of other groups. Several species of Arctians, some of them quite handsome and most of them rare, are out now; and the large Saturnians begin to appear. The beautiful *Actias luna*, "queen of the night," is the first to emerge. When properly spread for the cabinet it has a most graceful appearance; but its flight is very awkward, having about as much grace as that of a cockchafer. If the season is good a great many moths are attracted by sugar, among which *Catocala*, or *Catocalirrhus nubilis*, is the largest. It is grey, secondaries bright yellow, with two black median bands.

June is the month of butterflies and flowers. The swallow-tails are in their glory. *Danais archippus* has arrived, dusty and travel-stained, from the south. Three large *Argynnis—cybele, aphrodite*, and *atlantis*—are common the last of the month. *Melitæa phaëton, M. harrisii*, and *M. nycteis*, are common, but very local. Satyrids are not well represented in Eastern United States; only five species are native in New Hampshire, but they are all quite common. *Neonympha eurytris*, a small dark drab species, with two eye-spots on primaries and one on secondaries, is a common species on woody hills and rocky pastures in the early part of June. *Debis portlandia*, a larger and handsomer species, is not quite so common in the woods in the valleys. *Chrysophanus hypo-phlœas* is very abundant from May until October. It occurs in great variety, all grades, from the banded to the immaculate form, being common. The variations are more abundant in the spring brood. There are five species of *Thecla* flying in June,—three common, and two rather scarce. Around the banks of brooks, where alder grows rank, a delicate and rare little butterfly may be found from the 1st of June until the middle of August. It expands about an inch and a half; the upper side is tawny orange, with curious blotches and marks in black; the under side of secondaries is brown, with grey rings. This is *Feniseca tarquinius*, as far as is known the only carnivorous butterfly. The larva feeds on the plant-lice which infest the alder, currant, &c., but is hard to find, because it covers itself with down from its victims. The Hesperidæ this month are very numerous and varied. *Ancyloxypha numitor*, a small, but pretty brown and yellow species, is common around thick grass near standing water. There are eight species of *Pamphila* (*Hesperia*), two of *Amblyscirtes*, four of *Nisoniades* (*Thanos*), and three *Eudamus*. Most of them are common, and some are very abundant. The largest and handsomest is *Eudamus tityrus*. It expands from two to two and a half inches, and is dark brown, with a translucent honey-yellow band across the primaries, showing on both sides. The under side of secondaries is overlaid with purplish scales, and has a broad band of silvery white. The moths are very numerous and varied, and it is useless to try and enumerate them. *Samia cecropia* is the largest, often measuring six inches in expanse. *Actias luna*, *Telea polyphemus*, and *Callosamia promethea*, are not far short of it. *Hyperchiria io* is smaller, but more strikingly coloured. *Eacles imperialis*, yellow, with purplish markings, and expanding five inches, may be seen in the daytime clinging to grass and low bushes, and looking so much like a sere and yellow leaf as to deceive the eyes of any but an entomologist. Hawk-moths are abundant about the flowers of asclepias and honeysuckle; they are in great variety, but the large and showy species are in a great minority. The best night-collecting is done with lantern and sweep-net. It pays on most seasons to sugar, but there are not so many moths attracted as during the months of May, July, and August.

In July the season for butterflies and spinning-moths has begun to decline. The most noticeable arrival is *Argynnis idalia*, a large species, expanding from three to three and a half inches, with secondaries of a beautiful purplish black, with cream spots. *Satyrus alope* is extremely abundant throughout the month; the normal form has a broad yellow band on primaries; in var. *nephele* this band is wanting, but all the intergrades occur. A visit to the White Mountains, in the northern part of the State, is of particular interest to the entomologist at this season of the year. A pale and delicate Satyrid, *Chionobas semidea*, inhabits the highest peaks, and is found in no other locality within 2000 miles. A small *Argynnis* is also native there, and nowhere else; and several other species of butterflies, which are rare or unknown on the lowlands to the south, are common. Scattered through the State are many small mud-bottomed ponds, generally surrounded by a dense growth of spruce, and bordered by a bed of sphagnum. This is gradually encroaching on the water, not displacing, but floating upon it, until it is thick and strong enough to bear a man's weight. Here many plants which grow nowhere else find a footing and flourish, and with them an insect fauna. Among others is a small butterfly, *Chrysophanus epixanthe*. The female is dingy enough; but the male, when alive, with wings expanded to the sun, is a living gem. The primaries are brown, with violet reflections; the secondaries duller, with a wavy submarginal line of copper-red. From the middle of July until the 1st of September is the best time of the year for sugaring. There are between thirty and forty species of *Catocala* more or less common, all of which it is possible to capture in good condition during this season. A row of neglected pear trees forms another very good collecting locality at this season of the year, the honey-dew having an attraction superior to any artificial mixture which I have yet experimented with. There is always the possibility, too, of taking the enormous *Erebus odora*, which has occasionally been seen in this locality, and sometimes occurs in numbers.

August has little new in the way of butterflies, but several species appear as second and third broods. Among the former may be mentioned *Papilio troilus*, *P. asterias*, *Vanessa antiopa*, *V. atalanta*, *V. huntera*, *V. cardui*, *Danais archippus*, and the two *Limenitis*,—*L. artemis* and *L. disippus*. *L. artemis* is, perhaps, as handsome a butterfly as is to be found in New England. It is purplish black, with a broad white band across both wings. *L. disippus* is fulvous-veined, and bordered with black as in *Danais*. *Colias philodice*, *Argynnis myrina*, and *A. bellona*, appear as a third brood about the 1st of September. Although there is but one brood of the large *Argynnis*—*idalia*, *cybele*, and *aphrodite*—fresh specimens, especially females, continue to emerge until the 1st of September.

Good collecting is at an end by September, except in a few groups, notably *Vanessa* and *Agrotis*. *Danais archippus* occurs in great numbers preparatory to migration. The flight of this butterfly is very graceful, and a clover field when they are abundant is a very pretty sight. *Hemileuca maia*, a medium-sized Saturnian, is common on meadows. The wings are black, with a white band across both, and are of the texture and appearance of *Parnassius*. It flies by day; and when struck with a net or hat it folds its wings over its back, curls up its abdomen and legs, and feigns death.

October is a comfortless month for the entomologist. There is a better variety than in March, but there is much difference in looking forward or backward to June. There is little or nothing new. A few moths emerge, and at once hunt for winter quarters. The butterflies of the genus *Vanessa* give life and colour to the beautiful Indian-summer days, but they take good care to find a secure lodging at night, for fear that the next day may prove to be borrowed from December. A few *Colias* and *Pieris* appear as a fourth brood, but they are doomed to perish miserably during the wintry blasts of November.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 83.)

Hadena dentina, *Esp.*—Common, widely distributed, and very variable. Beside the type, with bluish-grey stigmata and subterminal band on a darker greyish ground, there is a common form of warm sepia tone, the central shade being similar but darker. The pale grey var. *leucostigma*, Haw., occurs rarely in Galway, Sligo, and elsewhere; and the unicolorous obsolete form, var. *ochrea*, Tutt (*dentina*, Haw. and Fab.), with yellow patches at base of the inner margin and elsewhere, is occasionally met with.

Hadena trifolii, *Rott.*—"Near Dublin, by the Rev. Joseph Greene" (*B.*). Mr. W. E. Hart reports having taken a specimen at Kilderry, near Derry, but I have not seen it.

Hadena dissimilis, *Knoch.*—The Devil's Glen, Wicklow, not common (*B.*); Castle Bellingham (*Thornhill*), and near Dundalk, Co. Louth, pretty numerous; Castle Gregory, near Tralee, Kerry, not rare; Clonbrock, Co. Galway, a few (*R. E. D.*). My Kerry specimens, and Mr. Thornhill's from Castle Bellingham, are referable to var. *suasa*, Bork.

Hadena oleracea, *L.*—Very common everywhere. The usual form is that with bright rusty brown ground colour, and well-marked stigmata and subterminal line. But specimens with dark brown ground, marked only with an orange trace of the reniform stigma, and an almost obsolete subterminal line, occur on islands off the Kerry coast, and occasionally elsewhere.

Hadena pisi, *L.*—Widely distributed, but rarely numerous. The Linnean type appears to be of a ferruginous ash colour ("ferrugineo-cinereis"), clouded with grey. I have a Scandinavian example of it which closely approaches Mr. Tutt's description of his var. *pallida.* I have not met with the type in Ireland. The very unicolorous yellowish-red type (var. *rufa*, Tutt) is very rare here, and I have never met with it of so yellow a tone as in English examples I possess; but the mottled form of it, varying in distinctness of pattern but decidedly redder than English examples, is more frequent (var. *distincta-rufa*, Tutt). The somewhat unicolorous purplish form, var. *scotica*, Tutt, I have not seen; but the majority of Irish specimens belong to the mottled purplish form with pale or ashy-grey stigmata and markings, and is frequently extremely bright and handsome. Var. *splendens*, St., I have from Toberdaly, King's Co., and Favour Royal, Co. Tyrone, of a ruddy brown, indistinctly marked with strigæ and stigmata, and the subterminal line nearly obsolete, except at the anal angle. I have a specimen of this also from Scandinavia. I cannot agree with Mr. Tutt in placing it near the type, which he gives in his classification, by some oversight probably, as having "a red-brown ground." Beside the foregoing there are in Ireland (found rarely) brown forms, from a bistre tone to an ashy grey-brown, with the subterminal line sometimes quite obsolete, except a trace at the anal angle, and, on the other hand, sometimes of twice the normal width throughout. These forms I have taken at Killary Bay and Clonbrock, Co. Galway; Drumreaske, Co. Monaghan; and the neighbouring Co. Tyrone; Markree Castle, Sligo; and Killynon, Co. Westmeath; and the var. *distincta-scotica* from the same; while the ruddy forms are from widely distant localities, and not localised. A dark brown specimen from the Bog of Allen, near Banagher, has exactly the coloration of *H. adusta*, and approaches Mr. Tutt's description of his var. *suffusa*, but the markings are not suffused but blotched with black, especially on the inner margins of the broken subterminal line and between the stigmata.

HADENA THALASSINA, *Rott.* — Common. Two Scandinavian examples from the collection of Sven Lampa show a warm greyish brown ground colour, with the pale strigæ and stigmata very slightly represented, but on one the dark ⊢⊣ trait and stigmatal outlines darkly marked. Their special characteristic is, however, the almost total absence of the whitish basal patch, though the black forked streak below it is retained. This pale patch, distinguishing this species usually from every form of *H. adusta*, is here obsolete, except for perhaps a faint pallor of the ground colour. With this exception identical greyish forms (var. *humeralis*, Haw.) occur in Ireland, but rarely. One from Hollybrook, near Boyle, is almost of a unicolorous grey, marked only by the white and black basal traits, and some traces of the subterminal pale line. Var. *achates*, Hb., occurs rarely, as at Sligo, and Favour Royal, Tyrone. The normal forms of Irish *H. thalassina* are very bright and strikingly marked, being in a series far handsomer than such as I have seen from England. That this is so, the frequently distinct delineation of the dentate mark (which Mr. Tutt, in describing *H. contigua*, notices as absent in *H. thalassina*) is evidence. Their ground colour varies from a rich brown madder to the cold bistre brown of *H. adusta*. The stigmata are often ringed with white, and sometimes filled in with grey, and the black and white strigæ and blotches vivid and distinct. The most striking form I have ever seen has the ground of brownish grey, with large white stigmata (except the lower part of the reniform), dentate mark, costal dashes, and strigæ. Throwing these into relief are sharply pencilled black markings and the ⊢⊣ trait, producing a very chequered appearance. Another form, of a warm brown ground, has the stigmata and dentate mark of paler tone, fused together, and with suffused outlines. The elbowed and basal lines are twice as broad as in most specimens, and shaded off at the edges.

HADENA CONTIGUA, *Vill.*—Local, and sometimes abundant. Very bright and handsome forms are found on the mountains bordering L. Gill, Sligo, and (but rarely) among those among which the R. Roughty takes its rise above Kenmare, probably approaching the form which Mr. Barrett noticed at Cannock Chase. They are suffused with a bright pink on the areas of the stigmatal and dentate and costal base marks, and when fresh are the most beautiful of all the genus *Hadena*. In one light Sligo example the whole ground colour (except a white patch of subterminal band at the anal angle) is suffused with rose colour. Some rose-flushed specimens have the basal half of the fore wing very dark, the basal striga and all markings, except the costal basal patch, being obsolete. The var. *dives*, Haw., occurs with the submarginal band very grey at Sligo, Kerry, and Castle Taylor, Co. Galway. None of these forms appear to be topomorphic. Localities:—Powerscourt, Co. Wicklow (*B.*); Cappagh, Co. Waterford, scarce; the districts about Kenmare and the upper L. of Killarney, not very rare; Ballinahinch, Moycullen, Ardrahan, Clonbrock, scarce; and one near Galway in September (a second emergence apparently) by Mr. Dillon in 1894; Cromlyn, Westmeath, one (*Mrs. B.*); Newcastle, Co. Down, one, which Mr. Watts describes as "having the darker parts of the fore wings suffused with rose-pink, and the pale portions a semi-metallic green." These colours, however, subsequently faded.

(To be continued.)

NOTES AND OBSERVATIONS.

Periplaneta australasiæ and P. americana.—The two cockroaches figured *ante*, p. 97, which both appear to have taken up their abode with us, are extremely likely to be confused one with the other. Both are rich reddish brown in general colouring, but it will be seen that while *P. americana* is the larger, *P. australasiæ* is more distinct in its markings. The deep black patch on the thorax of the latter, together with the broad yellow streak along the basal portion of the costal margin of the fore wings, would be sufficient to distinguish the species; but it should also be noticed that the hind wings are comparatively broader, and the mouth appendages shorter than those of *P. americana*. The abdominal appendages are very different in the two species. The specimen of *P. australasiæ* figured was captured in Kew Gardens on April 23rd, 1895, and recorded in error as *P. americana* (Entom. xxviii. 257); of the two, it is much the scarcer insect in these islands.—W. J. Lucas.

Nomenclature of the "Bee Hawk-moths."—I hope you will insert this note, to correct an error in the February number of the 'Entomologist' (*ante*, p. 41), as, if the error remains, there will always be a doubt thrown upon the record in question when it appears in print in the Harrow School publication. The insect captured by Mr. Percy Rhoades-Smith last year, and recorded (Entom. xxviii. 233), was a specimen of the *broad-bordered* species, *and not the narrow-bordered* species. I had the pleasure of examining the specimen shortly after its capture. —N. C. Rothschild; 25, Jesus Lane, Cambridge, Feb. 25th, 1896.

Captive female Chœrocampa elpenor attracting male.—In June, 1893, a friend of mine captured, near Exeter, a female *Chærocampa elpenor* and, not being an entomologist, he put it alive in a match-box. The next day he came on to Burton with his capture. While waiting at a station near Cheltenham he was surprised to see a moth, similar to the one he had in his pocket, keep flying round him and finally settle on his coat. He concluded it was his moth which had escaped, and he remarked to his companion how sorry he was to lose it, as it might have been a "rare specimen." On looking at his box, to see how his capture could have got out, he was, to use his own words, "astonished to find the insect was still in the box, and that this was another but similar individual which had settled on me." It is a well-known fact that the male of such insects as *Bombyx quercus*, *Endromis versicolor*, &c., are readily attracted by a captive female, but is this not rather uncommon among the "hawk-moths"? Can any of your readers tell me of similar incidents?—W. R. Smith.

Setting Lepidoptera.—Mr. Woodforde's remarks (*ante*, p. 83) are excellent, and go to the root of the matter. It is much to be wished that they may act as a nail in the coffin of the ungainly atrocities one sometimes acquires under the name of "specimens," especially among the Geometers. I do not see why there should not be some generally recognised standard of setting among those who exchange specimens; it must be confessed that there is no such thing now, although either the figures in Newman, as Mr. Woodforde says, or perhaps still better, the figure in Greene's 'Insect Hunter's Companion,' would supply the want. Press of work in summer should not be pleaded as an excuse, for it is surely more satisfactory to take fewer insects and set them properly, than to have a large number of specimens which correspondents will scarcely care to receive. Greene's remarks on this subject in the work mentioned above ought to be carefully read and laid to heart by every entomologist. A great reform would be quickly effected, if every exchanger would make a resolve never to send out an insect that he would not care to receive himself. I think it will be admitted that there has been considerable improvement in this respect of late years, but it is well to refer to the matter occasionally, that younger generations may know what is expected of them. As regards methods of setting, no doubt everyone will work out his own plan and stick to that; and, provided two or three general principles, well stated by Mr. Woodforde, as to height on pin and height on setting-board, are observed, the result will always be satisfactory. Details may differ indefinitely. Some people set their insects with cotton, a method which, personally, I regard with amazement not unmixed with awe. Others use bristles, the working of which I do not quite catch from Mr. Woodforde's instructions. For myself I find a thin strip of paper, supplemented afterwards by a broader one, does the business very well. But it is certainly necessary to have your specimen well relaxed, and the plan I have always adopted is simply to leave the day's catch in the cyanide bottle till the next morning, when my experience is that they are in just the right condition for pinning and setting, and they can be kept so for any length of time by transferring them to a box lined with damp cork. Of course, if kept here too long they will develop mould, and it is best to set them without the intervention of the damp cork, if possible, especially as I think it helps them to become greasy. As to grease, I do not think it need be much of a bugbear. Some moths certainly should be cleaned out at once, but most may safely be left untouched, for if they should develop grease they can then be as easily cleaned as at first; and if they do not, all the trouble will have been saved. Those which ought to be done at once are *Cerura*, *Cossus*, the larger *Sesias*, and *Luperina*. Ten days seems a good average time to leave on the setting-board, and I have found that even a moth which has been relaxed and reset will not spring when left at least so long. The large hawk-moths should be left at least fifteen days; and it should be remembered that insects do not dry so quickly in damp weather.—(Rev.) W. Claxton; Sunnyside, Woolston, Southampton, Feb. 29th, 1896.

[Mr. Woodforde was good enough to furnish drawings to illustrate several points of his article, but, unfortunately, it was not convenient to reproduce them. Anyone wishing to know how to make a setting bristle will find the information, together with a drawing of this implement, and also of other useful items connected with setting, in 'The Lepidopterist's Guide,' by Dr. Knaggs.—Ed.]

Scarcity of Pieris brassicæ. — Of the many problems which attract the attention of the entomologist, perhaps the abnormal abundance or scarcity of a given species in any particular locality is not the least interesting. Many instances of the former or latter in all probability occur in the experience of most collectors. The most remarkable instance of the latter which has come under my own observation is undoubtedly furnished by *Pieris brassicæ;* this is the more interesting, as it is one of the most generally distributed and abundant species found in these islands. Previous to 1893 *P. brassicæ* was one of the most abundant species found in this locality, and the damage done by its larvæ to the various cultivated varieties of *Brassica*, &c., was in many seasons very great; but in that year I first noticed a great falling off in its usual numbers, in fact, I cannot remember seeing more than a score of specimens altogether. In 1894 not a single specimen was observed, although closely looked for. In 1895 I paid particular attention to every specimen of the Pieridæ seen, but without detecting *brassicæ* in a single instance. Neither larvæ nor pupæ were seen in either year. Thus it is now more than two years since I saw a living specimen in any stage in this district. Of course I am not prepared to say that the species has ceased to exist in this particular locality, for its apparent absence may be in part due to imperfect observation, as it is impossible for one observer to cover even a limited district with absolute certainty; but its absence, either apparent or otherwise, is sufficiently remarkable, for, as every one knows, *brassicæ* is a species which does *not* as a rule require searching for; it forces itself upon the notice of even the least observant, either in the imago stage, or, as an unwelcome visitor, in the larval stage, in the kitchen garden. In the 'Entomologist' for 1894 (vol. xxvii.) there are several short notes calling attention to its scarcity in widely divergent localities; but in the volume for 1895 (nor in any other magazine to which I have access) I cannot find any notes recording unusual scarcity of the species under consideration. So perhaps we may assume that it was found in its usual numbers in most other districts. As far as this locality is concerned, it will be interesting to see if it occurs during the present year (1896), or if the unusual scarcity is continued for the third year in succession.—W. Grover; Guildford, February, 1896.

Larva of Pieris brassicæ in December.—I was greatly surprised last Sunday to see larvæ of *Pieris brassicæ* feeding upon a cabbage-plant in a neighbour's garden. Is not this an unusual occurrence at this time of the year? The larvæ I obtained in August were full-fed in September, and pupated the same month.—George R. Garland; 94, Sedgwick Road, Leyton, E., Dec. 19th, 1895.

Wingless or partially wingless Females. — Mr. Arkle remarks (Entom. xxviii. 163) upon the sluggishness of wingless females. In this I certainly cannot agree with him. I grant that they are quiet enough by day, but has he seen them at night? The activity of those of *Nyssia hispidaria* is quite remarkable, and I venture to say that they are quite capable of distributing their ova, even to the outer extremities of the larger oak branches. It appears to me that the loss of wing power is in a great measure compensated for by the length and strength of the legs. I have found most females inactive until after copulation, but the wingless females which have come under my observation are an exception to this rule. I should think that if it was a common practice for the males to carry up the females, pairs *in cop.* would be frequently captured on the wing. — A. T. Mitchell; 5, Clayton Terrace, Gunnersbury, W.

Note on Vanessa urticæ.—I found the larvæ of *Vanessa urticæ* exceedingly abundant last season, both in this district and in Devonshire. A series bred from Chiswick larvæ were remarkable for their tendency to the banded form in nearly all the specimens, and several were very strongly marked in this respect. Subsequently, hoping to get further varieties, I visited the exact locality, and collected a number of pupæ, of which all but one were suspended to the stems or leaves of the very nettles on which the larvæ had been nourished. The pupæ were all of the gilded form, that is, entirely gilded or nearly so, and they were consequently very beautiful objects, especially in a strong light. Although this form is mentioned in Newman's work, I had not previously observed it. I was quite unsuccessful in getting any good examples from these pupæ, for each produced only a multitude of small parasites. Could it be that the larvæ, being stung, had not sufficient strength to travel and pupate in the ordinary way on fences, &c., where I usually find them, and that the gilded appearance of the pupæ was caused by their position—unsheltered from the sun upon the wholly or partially defoliated food-plant? — Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W.

Aplasta ononaria.—The inclusion in the catalogue of Mr. C. E. Fry's insects, at his sale on the 9th inst., of a specimen of this insect, described as "taken at Folkestone, 3rd August, 1877, by C. Bailey," induces me to add a few remarks to Dr. Knaggs's note on this species (Entom. xxvii. 135), Mr. Bailey's specimen being, I believe, hitherto unrecorded, and coming as a surprise to most of us. The known captures were seven in number, all being taken in the Warren at Folkestone. The first specimen was taken on or about July 18th, 1866, by Mr. B. Piffard. This specimen was, as Dr. Knaggs says, given by Mr. Piffard to Mr. Henry Doubleday, in whose collection it still remains at Bethnal Green Museum. Three specimens were taken by Mr. Frank Standish, from whose collection they were purchased by Mr. S. Webb, of Dover, in whose rich collection they now are. Two other specimens were taken by Mr. Holyday, who tells me that they are both still in his own collection. The last of the seven specimens was taken by Mr. W. Purdey, of Folkestone, in June, 1871 (Ent. Mo. Mag. viii. 92). This specimen was sold by Mr. Purdey to Mr. Burney, at whose sale I purchased it. The fact that none of Mr. Burney's four specimens, although catalogued as taken by Mr. Piffard, were really taken by that gentleman was known to every one in the auction-room, as a letter from him to that effect was publicly produced and read out; but it was not generally remembered that one of these specimens really was Mr. Purdey's specimen. Those, however, who did remember it, and knew how specially interesting the specimen was to me, most kindly refrained from bidding against me, and enabled me to secure it. To prevent any future question or mistake, I also bought Mr. Burney's three other specimens, which are, of course, utterly valueless. I was with Mr. Purdey at the time of its capture. I saw him strike at it, saw it in his net, and by the light of his lantern assisted in determining its identity. It was to me therefore almost as if I had taken it myself. It was taken in the small rectangular recess on the left hand of the up-line between the crossing where the Warren Station now stands and the tunnel nearest Folkestone. I might perhaps add that shortly before Mr. Burney's death, Mr. Purdey wrote to him asking whether the specimen was still in his collection, and received a reply from Mr. Burney stating that it was; and since the sale I have taken it to Mr. Purdey, who identified it as his own.—C. A. Briggs; 55, Lincoln's Inn Fields, March 12th, 1896.

Sesia andreniformis.—Mr. Griffiths and Mr. Harding, of Clifton, both write to say that the late Mr. Wilkinson, of Scarborough, took only one specimen of *S. andreniformis* at Durdham. This particular specimen was certainly in Mr. Fry's collection, recently sold at Stevens's but the origin of the other examples, two in number, is now left in doubt.—Richard South.

The three specimens of *Sesia andreniformis* were thought by Mr. Fry and self to have come out of the late Mr. Wilkinson's collection. They were bought from Mr. E. G. Meek, who will doubtless be able to say from what source he obtained them.—H. McArthur; 35, Averill Street, Fulham Palace Road, W.

A Further Note upon the Larva of Colias hyale.—Although a considerable time has elapsed since my notes upon the life-history of *Colias hyale*, when breeding this species from the egg (Entom. xxvi. 7), I think it well, if only on account of the few opportunities we have of making any observations upon this insect, to record the fate of the larvæ that were then alive. At that time (Dec. 10th, 1892) three larvæ were living in a perfectly quiescent state, having been in that condition for about thirty days. On Nov. 26th these three larvæ, having been in one position for about a fortnight, two resting on the side of the jar in which they were contained, and one on a partly curled-up leaf, all being apparently unaffected by the high temperature to which they had been subjected, I removed them from the heat to see whether it would be possible to hybernate them, and for this purpose placed them in a room not artificially heated. On Dec. 16th one larva changed its position slightly, but, after again remaining stationary for a few days, died, and on Feb. 22nd, 1893, the second one died. The third and last remained on the clover-leaf until March 17th, when, finding it moving about, I placed it upon a plant of clover. On the following day it commenced feeding, resting at night usually on the stem of the plant; it fed freely, and all went well until April 8th, when it affixed itself to the stem and assumed the well-known position portending a change of skin; but unfortunately it did not survive the operation, as on April 10th it was lying on the surface of the moss in a helpless condition, and died on the 13th, having failed to moult. Its length was then seven-sixteenths of an inch. It will thus be seen that this larva refrained from food from the middle of November to March 17th, say, over 120 days; and thus it appears clear that *Colias hyale* has the power of hybernating in the larval stage, whatever it may do in its natural state in those countries more favoured by this species than our own; and it would be interesting if some of our authorities can definitely tell us in what stage *C. hyale* passes the winter season upon the Continent, and in those parts of the globe in which it is a regular inhabitant.—HERBERT WILLIAMS; 80, Hanley Road, Hornsey Rise, London, March 9th, 1896.

VANESSA URTICÆ IN JANUARY.—At midday on January 16th last, a specimen, in good condition, of *V. urticæ*, deceived by the mild weather, was tempted to take a winter flight in the garden.—A. J. HOARE; 13, Knight's Park, Kingston-on-Thames, Feb. 5th, 1896.

[Several correspondents have written to inform us that they observed the species on the wing during the first half of February.—ED.]

RETARDED EMERGENCES.—I bred during last season *Papilio machaon* and *Anthocharis cardamines*, both of which had been two winters in pupa. Forcing was attempted early in the previous year, but over one dozen of the former and three of the latter held over. The *A. cardamines* are quite normal, but two of the *P. machaon* pupæ were quite unusual in the development of the imago. The abdomen of the perfect insect appeared quite ready for emergence before the pattern of the wings became visible. One example died, and the other, though much crippled, resulted in a remarkable dark variety. I may also mention two emergences of *Eriogaster lanestris* (four winters in pupa).—A. T. MITCHELL; 5, Clayton Terrace, Gunnersbury, W.

PARASITES BRED.—*Macquartia affinis*, Schin. This fly has been bred from the larva of *Chrysomela varians* by Mr. Key, of Plymouth, who kindly gave me a specimen.—*Eucyrtus flaminius*, Dalm. I have bred this pretty little Chalcid from the apple-scale insect, *Mytsillaspis pomorum.*—*Myina phillyreæ*, Hal.; parasitic on *Aleyrodes phillyreæ*, Hal. Both of these occur commonly in Mr. Richardson's garden at Chickerell.—*Exochus gravipes*, Gran.; from *Nephropteryx genistella.*—*Tetrastrichus eudemus*, Walk.; from *Coleophora trifolii.*—*Entedon amyelas*, Walk.; from *Nepticula gei.*—*Derostenus gemmeus*, West.; from *Conchylis* *francillana.*—*Tranoderis macilipenne*, Walk.; from *Nepticula oxyacanthella.*—C. W. Dale.

Recent Additions to the British List of Lepidoptera.—Mr. B. A. Bower has prepared, and had printed, a label-list of all the recent additions to our lepidopterous fauna. The compiler has asked us to state that he will be happy to send a copy of this list to any one who may want it, on receipt of an addressed and stamped (½d.) envelope. His address is—Langley, Eltham Road, Lee.

CAPTURES AND FIELD REPORTS.

Note on Hybernia rupicapraria.—Acting on a hint given me by my friend and neighbour Mr. Woodforde, I have been taking pretty freely during the past week the females of *H. rupicapraria.* I have found both sexes by lantern-light, sitting on hawthorn hedges, though of course the females are far more difficult to see than the males. I find the former increasingly abundant as the night gets older, and generally on the highest twigs of the hedges, where they await, I suppose, the advances of their suitors. But it strikes me as remarkable that, although I have several times seen the two sexes within a foot or two of each other, I have not, so far, seen any *in cop.* It may be that they pair late at night, *viz.* after ten o'clock, up to which time I have been out on several occasions. Can any of your correspondents give me information on this point?—(Rev.) Chas. F. Thornewill; Calverhall Vicarage, Whitchurch, Salop, Feb. 14th, 1896.

Eugonia alniaria (tiliaria), Hybernia defoliaria, &c. — Mr. Garland's communications (*ante*, p. 66) as to the scarcity of *Eugonia alniaria* (*tiliaria*) in the Leytonstone district, is somewhat interesting to me. I have done very little collecting for the past ten years, but intend to make up in the future for my neglect in the past. In 1884 and 1885, when living near George Lane Station (under two miles from Leytonstone as the crow flies), I used to take this insect freely at indoor light, and always regarded it as common. I also noted, as stated by Mr. Garland, the exceeding abundance of *Hybernia defoliaria* in Epping Forest last November and December, though this was to be expected from the boundless profusion of the larvæ in the preceding May and June. I then observed many hawthorn bushes stripped of every vestige of a leaf, the bare twigs being literally alive with larvæ, chiefly those of *H. defoliaria.* Somewhat to my surprise, I found a newly emerged male of *H. defoliaria* at Monk Wood so late as Jan. 2nd of this year. Perhaps I may be allowed to add that I shall be glad to make the acquaintance of entomologists residing in this neighbourhood, or anywhere around Epping Forest, with a view to joint excursions during the coming season, &c., and shall esteem it a favour if any such will call or write.—E. B. Bishop; 7, Anton Street, Amhurst Road, Hackney, March 4th, 1896.

Variety of Lycæna bellargus (adonis).—Mr. R. M. Prideaux (*ante*, p. 91) mentions the capture of a white underside variety of *Lycæna alexis* in the Isle of Wight. It may therefore be interesting to record the capture, in September last, of what appears to be an exactly parallel form of *L. adonis* on the South Downs near Eastbourne. The specimen, like that of *L. alexis* captured by Mr. Prideaux, is a male.—E. M. MONTGOMERY; 32, The Grove, Ealing, March 13th, 1896.

CALLIMORPHA HERA IN SOUTH DEVON.—After Mr. W. Hewett's exhaustive remarks upon the capture of the imago and the breeding of this lovely species (Entom. xxviii. 290), I have very little to add. In company with Mr. H. Robson, I had the pleasure of meeting Mr. Hewett near Starcross, and it is pleasant to be able to endorse his statement regarding the wide distribution of *C. hera.* Contrary to his experience, we found it more easily obtained in bright sunshine. During the first three days of our visit the weather was dull, with a great deal of rain, and jointly we only obtained three specimens (one on each day), while on the other hand eleven examples were secured on one very hot day. Referring to the specimen taken on the wing, not apparently disturbed, it was flying over clover blossoms quite naturally, in fact, like a butterfly. Although none were attracted by the fen-lamp, probably because we did not stay late enough, one example (a female) was discovered on the outside of the bedroom window, at rest on the framework, about midnight. This was on the last night of our visit. The window had an eastern aspect, facing the estuary of the Exe. Referring to other species captured, the following I think are not mentioned by Mr. Hewett:—*Pyrameis cardui*, *Colias edusa* (one seen), *Thecla quercus*, *Noctua umbrosa*, *N. rubi*, *Triphæna ianthina*, *Hadena suasa*, *Charæas graminis*, *Selenia bilunaria*, *Crocallis elinguaria*, *Eugonia fuscantaria*, *Lobophora viretata*, *Melanippe unangulata*, *Anticlea rubidata*, and *Cidaria russata*. *Abraxas grossulariata* we found exceedingly abundant in the hedgerows, and on several occasions it gave us a false alarm. Larvæ appeared decidedly scarce, but they were not much worked. *Eupithecia linariata* infested nearly every patch of toadflax, and a solitary full-fed *Smerinthus tiliæ* was found under an elm.—ALFRED T. MITCHELL; 5, Clayton Terrace, Gunnersbury, W.

MOTH-TRAPS DURING 1895.—On the whole the season was quite up to the average, though I was unable to set the traps during part of July and September and the whole of August. Several species, therefore, which I have taken in other seasons are necessarily absent. The following were taken which are new to my "trap-list," viz.:—*Sarothripus undulanus* (one), *Gortyna ochracea* (one), *Noctua triangulum* (several), *Agriopis aprilina*, *Calocampa vetusta* (one), *Asthena luteata* (one), *Cabera exanthemaria* (several), *Macaria notata* (one), *Lomaspilis marginata*, *Eupithecia castigata*, *E. indigata* (one), *E. dodoneata* (two), *E. coronata* (one female), *Lobophora viretata* (one), *Thera firmata*, *Melanippe unangulata* (one), *Melanthia bicolorata* (one), *Cidaria corylata* (several), *Peronea variegana* (one), *Penthina ochroleucana* (one). *Sericoris lacunana*, *Bactra lanceolana*. *Nemophora schwarziella*, *Œcophora flavifrontella*, *Œ. pseudospretella*, *Coleophora fabriciella*, *C. albicosta*. The following were the best captures among the species previously recorded, viz.:—*Stauropus fagi*, *Pterostoma palpina*, *Notodonta trepida*, *Rusina tenebrosa* (three females, only males previously recorded), *Xanthia aurago*, *Asteroscopus sphinx* (208 males and one gynandrous specimen—right antenna male and left female), *Aventia flexula*, *Eurymene dolobraria*, *Eupithecia pulchellata*, *Leptogramma literana*.—E. F. STUDD; Oxton, Exeter, Feb. 25th, 1896.

LEPIDOPTERA AT BLOXWORTH IN 1895.—Various causes during 1895 hindered the usual amount of attention we were able, in former years, to give to Lepidoptera; but, so far as could be observed, it was an unsatisfactory season in this district. Macros were decidedly scarce, and few worth noting, excepting in respect to their scarcity; some species, usually common, did not appear at all. Micros, however, turned up rather better, but in numerous instances these also were much rarer than usual. Among the best that came to hand, both of Macros and Micros, perhaps the following are worth recording:—*Sphinx convolvuli.*—*Lasiocampa trifolii.*—*Lithosia complana.* This moth I have not seen, until now, for many years past; formerly it used to be of pretty regular occurrence.—*Platypteryx hamula.*—*Triphæna subsequa.* Two, just emerged, under the leaves of a thistle in the middle of a grass-field.—*Plusia festucæ.* A larva on meadowsweet, in June, spun up in a loose cocoon, and the perfect insect came out about two or three weeks after. I have only met with this species once before in Dorset.—*Acidalia immutata.*—*Lobophora viretata.* — *Scotosia undulata.*—*Cataclysta stratiotalis.*—*Phoxopteryx diminutata.* Scarce.—*P. subarcuana.* Abundant. — *P. biarcuana.* Rather frequent. — *Ditula semifasciana.* — *Cnephasia cinctana.* — *Eupœcilia geyeriana.* Scarce; chiefly though, I think, owing to the very unfavourable weather for its flight. On several evenings, though worked for closely, not one appeared; but on the next evening it was flying abundantly for half an hour or so, but almost all worn.—*Tinea nigripunctella.* This (I believe rather rare) little moth has occurred here at the rate of about one in two or three years for many seasons past; this last year, however, I caught 102 on one window—next to the room in which I sit—during about four weeks, in July and August.—*Sophronia parenthesella.* Not seen here until now, for many years. — *Cerostoma vittella.* Several; usually very scarce. — *Ypsolophus lucella.* Very scarce this season.—*Chauliodus chærophyllellus.*—*Laverna lacteella.* Very scarce.—*L. decorella.*—*L. atra.* More abundant than usual; on apple and whitethorn.—*Œcophora lambdella.* Scarce.—*Batrachedra præaugustella.* Rather abundant on one spot. I had not met with it until now for many past years.—*Cosmopteryx orichalcella.* Much scarcer than in the previous season, but not unfrequent in one swampy locality.—*Gracilaria tringipennella.* Two specimens; the first I have met with in this district—*Stephensia brunnichella.* Very scarce.—*Aciptilia paludum.* Very scarce; one specimen as early as June 4th.—O. P. CAMBRIDGE; Bloxworth Rectory, Feb. 16th, 1896.

MACRO-HETEROCERA IN THE GUILDFORD DISTRICT (continued from p. 93).—NOCTUÆ.—**Bryophila perla.* Fairly common at rest on garden walls. These latter are here in many cases built of "Bargate stone," which quickly becomes covered with lichen.—**Acronycta psi.* Common; both imagos and larvæ. It is quite possible that a few *A. tridens* are mixed with these; but as I have never found larvæ of this species, and find I am unable to distinguish the imagos apart, it is impossible to say with certainty if it occurs here.—**A. leporina.* Two specimens; July 26th, 1888, and June 25th, 1895.—**A. aceris.* A few; both imagos and larvæ. A number of the latter found in the garden in 1895.—**A. megacephala.* A few; both imagos and larvæ.—*Diloba cæruleocephala.* Common; chiefly as larvæ. On May 30th, 1889, I found a number of larvæ feeding upon common laurel; of four taken only one attained the imago stage; the others died when nearly full-fed. Perhaps the food-plant had something to do with the mortality. I know this food-plant has been recorded before (Entom. xxiii. 292, &c.), but I believe it is not usual.—**Leucania conigera.* Fairly common at flowers of privet (*Ligustrum* *vulgare*) in most years.—**L. lithargyria*. A few imagos, but larvæ very common. — **L. impura*. Rather common; also larvæ, **L. pallens*. Common. There was a late brood of this species at end of Aug. and beginning of Sept., 1893.—*Hydrœcia nictitans*. One specimen, Sept. 15th, 1891.—**H. micacea*. One at light, Aug. 31st, 1893.—**Axylia putris*. Fairly common.—**Xylophasia rurea*. Fairly common.—**X. lithoxylea*. A few specimens.—**X. monoglypha*. Very common in most years, but scarce in 1895.—**X. hepatica*. A few, but several years ago.—**Neuronia popularis*. Two, Aug., 1886.—*Cerigo matura*. One taken in 1885.—**Luperina testacea*. A few specimens.—**Mamestra sordida*. A few only.—**M. brassicæ*. Abundant every year.—**M. persicariæ*. Rather common. Larvæ on many different plants.—**Apamea basilinea*. Common everywhere,—**A. gemina*. One specimen in 1886.—**A. didyma*. Very common, and exceedingly variable.—**Miana strigilis*. Fairly common, and rather variable. — **M. bicoloria*. A few specimens. — **Grammesia trigrammica*. A single specimen —**Caradrina morpheus*. Fairly common.—*C. quadripunctata*. One specimen in 1886.—**Rusina tenebrosa*. Two or three odd specimens.—**Agrotis puta*. One pupa: imago emerged June 6th, 1894. —**A. segetum*. Common in most years.—**A. exclamationis*. Very common in most years, but scarce in 1895.—**A. corticea*. Common in most years.—**A. tritici*. Fairly common.—**A. obelisca*. One specimen, July 20th, 1895, taken at flowers of *Epilobium angustifolium*.—**Noctua plecta*. One, June 4th, 1893.—**N. c-nigrum*. A few, but several years ago.—**N. triangulum*, *N. brunnea*, **N. festiva*. A few each year.—**N. xanthographa*. Very common.—**Triphæna ianthina*. Rather common in 1886, but only a few seen since.—**T. comes*, Hb. Very common, both imagos and larvæ. — **T. pronuba*. Abundant. Variation considerable. — Var. *innuba*. Common. Larvæ only too common.—**Amphipyra pyramidea*. Fairly common at treacle in most years, but not seen in 1895.—**A. tragopogonis*. Very common in most years. A few larvæ found on various plants. One found feeding upon stonecrop (*Sedum acre*).—**Mania typica*, A few specimens.—**M. maura*. Rather common in most years, but scarce in 1895.—*Pachnobia rubricosa*. A single specimen taken March 21st, 1894.—**Tæniocampa gothica*. Common in most years. Larvæ found on many plants. —**T. incerta*. Fairly common. A few larvæ found.—**T. stabilis*. Abundant every year.—**T. munda*. One taken, March 21st, 1894.—**T. pulverulenta*. Common in most years, but rather rare in 1895. —**Orthosia macilenta*. A few specimens.—**Anchocelis rufina*. One at treacle, Oct. 13th, 1894.—**A. pistacina*. A few taken in most years.—**A. litura*. A few; also larvæ.—**Cerastis vaccinii*. Common at sallows in the spring, but few seen in the autumn.—**C. spadicea*. A few specimens.—**Scopelosoma satellitia*. A few, most of them in the spring, after hybernation.—**Xanthia citrago*. A few imagos. Larvæ fairly common in the garden in some years.—**X. fulvago*. A specimen found dead in the house, Sept. 24th, 1895.—**Tethea subtusa*. Two or three; also a larva on aspen.—**Calymnia trapezina*. Fairly common; also larvæ.—**Eremobia ochroleuca*. One specimen in 1886.—**Dianthœcia nana*. One at light, June 29th, 1886—**D. capsincola*. A few only.—**D. cucubali*. One, June 20th, 1895, at *Epilobium angustifolium*.—**D. carpophaga?* I have one specimen which I believe to be this species; it is the very light variety figured in Newman's 'British Moths,' p. 385, top figure.—**Hecatera serena*. A few specimens.—*Cleoceris viminalis*. One, July 11th, 1894. *Miselia oxyacanthæ*. One larva found on blackthorn, May 4th, 1894. Imago emerged, Oct. 9th.—*Agriopis aprilina*. One bred, Oct. 10th, 1885.

Have had several larvæ since, but failed to breed imagos.—**Euplexia lucipara*. Fairly common in most years.—**Phlogophora meticulosa*. Very common every year; also larvæ.—*Aplecta nebulosa*. One taken, June 13th, 1893.—**Hadena protea*. A few at various times.—**H. oleracea*. Very common. Larvæ found on many plants.—**H. thalassina*. Three or four odd specimens. — *Xylocampa areola*. A few only. — **Gonoptera libatrix*. A few taken in the house at various times. — **Habrostola tripartita*. A few at light, in the house.—**Plusia chrysitis*. Fairly common. One, bred June 20th, 1889, has but three wings, the left posterior wing being entirely absent.—**P. gamma*. Very common every year. Swarmed everywhere at end of Sept., 1895.—*Anarta myrtilli*. One taken July 8th, 1892, at rest upon bracken (*Pteris aquilina*).—*Euclidia mi*. Fairly common.—*E. glyphica*. A few. As a rule, these are both in very bad condition, but this seems to be also the case in other districts.—**Catocala nupta*. Common. I take this species more or less commonly at treacle every year in the garden. Scarce in 1894. Over thirty seen in 1895. A few found on aspen several years ago in the garden; it most likely breeds there every year.—*Aventia flexula*. A single specimen taken in a wood, July 6th, 1895.—*Hypena proboscidalis*. Very common.—W. Grover; Guildford, Nov. 1895. [To be continued].

SOCIETIES.

Entomological Society of London.—*February 5th*, 1896.—Professor Raphael Meldola, F.R.S., President, in the chair. The President announced that he had nominated Dr. D. Sharp, F.R.S., Mr. Roland Trimen, F.R.S., and Mr. Walter F. H. Blandford, Vice-Presidents for the Session 1896–1897. The Rev. John Hocking, M.A., of Copdock Rectory, Ipswich, and Mr. J. C. Moberley, M.A., of 9, Radstock Place, Southampton, were elected Fellows of the Society. Mr. Waterhouse exhibited pupæ and portions of pupæ of a silk-moth, *Antheræa mylitta*, selected from scores of specimens, which he had opened to see if they showed stages of development agreeing with the examples given by Dr. Spuler. The results appeared to confirm Dr. Spuler's researches; some specimens showed the tracheæ, the median vein having two branches, very rarely emitting a third branch in the direction of the radial. Other specimens had faint indications of the veins and of the discoidal spot of the imago. Even at this very early stage the vein branching from the subcostal vein to unite with the upper radial, and the short branch uniting the second median vein with the third median, were distinctly traceable, no tracheæ being yet visible in these branches. Mr. Merrifield, Mr. Hampson, and Dr. Sharp took part in the discussion which ensued. Mr. E. E. Green remarked that in the Trans. Ent. Soc., 1881, p. 601, there was a short paper by the late Prof. J. O. Westwood, describing a curious little insect from Ceylon, under the name of *Dyscritina longisetosa*. Prof. Westwood believed his typical specimens to be immature. Mr. Green exhibited what he supposed to be a later stage of the same species. He said his example differed in some particulars from Westwood's description and figure, notably in the proportions of the caudal appendages. Prof. Westwood pointed out the affinities of *Dyscritina* to the Forficulidæ. This was very apparent in the specimen under consideration. Putting aside the nature of the caudal appendages, the insect was in all particulars an earwig. The present specimen was taken in the Punduloya district of Ceylon, at an elevation of about 4000 feet. Mr. Green said he had more than once seen this insect under loose pieces of bark and in crevices of rocks, and had always been struck by its likeness to an earwig, both in appearance and habits. Mr. McLachlan, Dr. Sharp, Mr. Gahan, Mr. Blandford, and Mr. Hampson made some remarks on the subject. Mr. O. E. Janson exhibited a Goliath beetle, from the Upper Congo, which he believed to be the male of *Goliathus russus*, Kolbe, described from a unique female example in the Berlin Museum. Mr. Blandford called attention to the case of the eye of a boy affected with inflammation caused by the hairs of the larvæ of *Lasiocampa rubi;* the attack recurred after an interval of nineteen weeks, and in several continental cases this recurrence of the attack had been found to take place, and in some cases permanent injury to the eye had followed. Mr. Blandford discussed the various kinds of hairs on several caterpillars, certain species having hairs of three kinds, one kind being barbed, and thus having the power to work into the skin. He said that the urticating property of the hairs appeared to be mechanical; there was no evidence of any poison glands. Mr. Lawford said he had some difficulty in discovering hairs in the lid, and he thought that the symptoms in the case in question were not to be explained by mechanical irritation alone due to the presence of hairs in the tissues. The subject was a new one to him, and he had looked up all the medical literature bearing on it. Lord Walsingham, Mr. Tutt, Prof. Poulton, Canon Fowler, and Mr. Jacoby made some remarks on the subject. Dr. F. A. Dixey read a paper entitled "On the Relation of Mimetic Patterns to the Original Form." The paper was illustrated by coloured diagrams. Prof. Poulton expressed his gratification with the paper, and with the fact that the Hope Collection under his charge had afforded material for the work. He thought the result of the paper was to give support to the theories of Fritz Müller rather than to those of Bates. Mr. Blandford, Mr. Tutt, and Prof. Meldola continued the discussion. Dr. Sharp contributed a paper entitled "The Rhynchophorous Coleoptera of Japan." Part IV. —H. Goss & W. W. Fowler, *Hon. Secs.*

February 19*th*, 1896.—The President in the chair. Mr. T. Hudson Beare, of Park House, King's Road, Richmond; Mr. William James Kaye, of Worcester Court, Worcester Park, Surrey; and Mr. Charles H. Dolby-Tyler, of the British Consulate, Guayaquil, Ecuador, South America, were elected Fellows of the Society. Dr. D. Sharp exhibited preparations of *Dytiscus latissimus* and *Cybister roesselii*, to show the so-called secondary wing, noticed by Meinert. He stated that this structure is only a part of the elytron, to which it is attached, and that he considered that it corresponded with the angle at the base of the wing seen in so many insects that fold their front wing against the body. He could not consider that this structure afforded any support to the view that the elytra of beetles correspond with the tegulæ of Hymenoptera rather than with the front wings. He also exhibited specimens of Neuroptera, and pointed out that this secondary wing agreed in position and structure with a small lobe on the front wing of Raphidia. Mr. McLachlan, Prof. Meldola, and Mr. Gahan made some remarks on the subject. Mr. C. G. Barrett exhibited, for Dr. H. G. Knaggs, cells of *Retinia resinana* formed of resin but lined with wax. A portion of the cell had been removed and the resin dissolved away with spirit, leaving a slight film of wax (*cf.* Ent. Mo. Mag., Nov. 1895, pp. 251, 252). Mr. Tutt stated that a secretion of wax had been detected by Dr. Chapman in *Parnassius apollo*. Prof. Meldola suggested that as Dr. Knaggs had shown how to separate the resin from the wax it would be of interest to make a chemical investigation of the latter, since a sufficient supply of this material could easily be obtained. No insect wax, with the exception of that of the bee, had been submitted to investigation by chemists. Mr. Hampson and Mr. Blandford continued the discussion. Mr. Gahan exhibited drawings of the dorsal segments of the abdomen of *Dyscritina longisetosa*, formerly described by Prof. Westwood in Trans. Ent. Soc., 1881, a specimen of which was shown by Mr. E. E. Green at the last meeting of the Society. He regretted that no drawing showing the ventral surface had yet been prepared. Mr. McLachlan, Dr. Sharp, and Mr. Green made some remarks on the subject. Mr. B. A. Bower exhibited specimens of *Argyresthia atmoriella*, Bankes, taken in Kent in June, 1894, a recent addition to the British Lepidoptera. Mr. E. E. Green read notes on the habits of the Indian ant, *Œcophylla smaragdina*, Fabr. He said he believed that, at some previous meeting of the Society, Mr. H. N. Ridley, of the Singapore Museum, had made some remarks on this ant and its supposed habit of using its own larvæ as web-spinners in the formation of its nest; but though he had not been able to find anything on the subject in the 'Proceedings,' Mr. Green stated that he was now able to produce corroborative evidence from an independent source. The facts were noted by his friend Mr. W. D. Holland, of Balangoda, Ceylon, a most careful observer. Mr. Green exhibited the specimens referred to by Mr. Holland, and pointed out that the larvæ were still tightly grasped by the jaws of the ants, and he thought it probable that other web-spinning ants utilised their larvæ in the same way. Mr. Hampson said he could confirm this statement. Mr. G. F. Scott-Elliot read a paper entitled "Notes on the Flower-haunting Diptera." The author pointed out that some of the higher types of Diptera appeared to prefer red and blue flowers, and oftener visited the complicated types of plants than the smaller Hymenoptera. He also alluded to the effect of insect visitors in isolating particular individuals. Prof. Meldola expressed himself much interested in the paper, and stated that although he was aware, from the writings of Hermann Müller and others, that Diptera played an important part in the fertilisation of flowers, he was unaware of the very great importance which these insects possessed for the function of pollination until he heard Mr. Scott-Elliot's paper. He also called attention to the urgent need of a manual of British Diptera. Mr. Roland Trimen mentioned that in South Africa some species of Orchidaceæ were fertilized by Diptera. Dr. Sharp referred to Professor Plateau's opinion that neither the colour nor form of the flower played any part in attracting insects. Mr. McLachlan remarked that the flowers of *Scrophularia* possessed a great attraction for wasps. Lord Walsingham enquired whether any observation had been made as to the Diptera which visited differently coloured flowers of the same species, such as petunias. Mr. Barrett, Mr. Green, and Mr. Scott-Elliot continued the discussion. Mr. Tutt read a paper, by Prof. A. Radcliffe-Grote, entitled "On the Nomenclature of the Geometridæ." A discussion on the rules of nomenclature followed, in which Lord Walsingham, Prof. Meldola, Mr. Hampson, and Herr Jacoby took part.

March 4th.—W. F. H. Blandford, Esq., M.A., F.Z.S., Vice-President, in the chair. Mr. P. Marshall, M.A., B.Sc., F.G.S., of Canterbury College, Lincoln, New Zealand, was elected a Fellow of the Society. Mr. Percy H. Grimshaw exhibited specimens of *Cephenomyia rufibarbis*, Meigen, a new British Bot-fly parasitic on the red deer. He said that the specimens were collected by Mr. L. W. Hinxman, in Ross-shire in June and July, 1894, and in the Cairngorm Mountains in 1895. Mr. C. G. Barrett exhibited, for Mr. Porritt, a black variety of *Polia flavicincta*, taken at sugar in his garden at Huddersfield; a variety of *Cosmia trapezina* with a blue-black central band; and a variety of *Mania typica* with pinkish white central markings, bred by Mr. Turnstall, of Huddersfield. Mr. A. H. Jones exhibited specimens of the following butterflies, captured at Coomassie by Major Henry P. Northcott during the recent expedition, viz. *Papilio zenobia*, *Elymnias bammakoo*, *Limnas alcippus*, *Romaleosoma gausape* (var.), *Catuna cœnobita*, *Terias sengalensis*, and *Neptis nemetes*. Sir John T. D. Llewelyn, Bart., M.P., exhibited specimens of a small species of Diptera which he believed to be parasitic on *Trochilium sphegiforme*, as he had bred a number from that species. He remarked that *T. sphegiforme*, although one of the most local and rare moths in this country, had occurred last year on the estate of Sir James Hill-Johnes, K.C.B., at Dolau Cothy, Carmarthenshire, in such numbers in the larval state as almost to destroy the whole of the alders growing there. Mr. G. H. Verrall said that the insects belonged to a species of *Phora*, possibly *Phora rufipes*, which fed on almost everything, but were not considered to be truly parasitic; they seemed blacker than typical specimens of that species. Mr. Hampson exhibited an exotic species of Locustidæ, which Lord Walsingham had found in his conservatory at Merton Hall, Norfolk. He stated that Lord Walsingham had not imported any exotic plants for some years. Dr. Sharp exhibited specimens of the pupæ of *Micropteryx* (probably *semipurpurella*), and drawings to illustrate their structure. The pupæ were sent to him by Dr. Chapman, who had described their peculiarities in the 'Transactions' of the Society in 1893. Dr. Sharp considered the pupa to be that of a trichopterous insect; most of its structures were those of Trichoptera, and the account given by Dr. Chapman of its emergence showed that this was essentially the same as that of Trichoptera. He remarked that the imago of this division of *Micropteryx* had been already shown to approach Trichoptera in several respects, and suggested that it should be treated as a group of Trichoptera whose larvæ are not aquatic in habits. If this course were not adopted, he felt clear that Trichoptera could not be maintained distinct as an order from Lepidoptera. Mr. McLachlan said that so long ago as 1865 he had suggested the close affinity of *Micropteryx* to the Trichoptera; the opinion then formed had since been much strengthened, but he was not disposed to admit coordinal relationship. Mr. Hampson, Mr. Barrett, and Mr. Blandford also took part in the discussion which ensued. Mr. McLachlan exhibited a single instance of monstrosity in a dragon-fly. The insect was a male of *Hetærina occisa*, Hag., from Venezuela. On the left side were three wings, two mesothoracic and the other metathoracic; on the right side only one wing, the metathoracic. The supplementary wing on the left side was inserted almost immediately beneath the ordinary wing; it was normal in form and neuration, but the red pigment at the base (fully developed in all the other wings) was not evident, the wing in this respect being similar to those of highly immature examples of the same species. Mr. E. E. Green exhibited a larva of an homopterous insect—one of the Cicadinæ—from Ceylon, having what appeared to be a head at its caudal extremity. He pointed out that the larva had caudal appendages which might be mistaken for hairy antennæ, and pigment spots resembling eyes on the antepenultimate segment of the body. The insect walked either backwards or forwards, and when first seen looked like a beetle of some kind, the caudal extremity representing the head. Mons. Louis Péringuey contributed a paper entitled "Descriptions of New Species of South African Coleoptera, chiefly from Zambesia." Dr. Sharp read a paper, by Prof. Williston, entitled "On the Diptera of St. Vincent, West Indies." Part. I.

March 18*th*.—The President in the chair. Mr. T. A. Gerald Strickland, of Oakleigh, near Ascot, Berkshire, was elected a Fellow of the Society. Mr. C. G. Barrett exhibited a series of drawings of varieties of British Lepidoptera in the collection of Mr. S. J. Capper, of Huyton Park, Liverpool. The drawings, which were beautifully executed, were by Mr. S. L. Mosley, of Huddersfield, and comprised 389 figures, representing 139 species, of which 33 were butterflies and 50 moths. Herr Jacoby enquired whether any record had been kept of the localities in which these varieties had been caught, or of the conditions under which they had been bred. Mr. Barrett, in reply, stated that none of the varieties exhibited had been obtained by breeding under artificial conditions for the purposes of experiment, but they were all natural varieties due to the influence of climate or soil, or to the latitude of the localities where they were caught or bred. Mr. Porritt added that Mr. Capper had made a special collection of the Yorkshire forms of *Arctia lubricipeda*. Mr. J. J. Walker, R.N., exhibited a specimen of *Procas armillatus*, taken on Durland Hill, near Chatham, during the present month. Herr Jacoby exhibited a specimen of *Loxoprosopus ceramboides*, Guér., from Brazil. Mr. E. E. Green exhibited the eggs of some species of Locustidæ extracted from the stem of a young cinchona tree at Punduloya, Ceylon. He said the species of the parent insect was undetermined; it was possibly either a *Cynatomera* or a *Cyrtophythes*, both of which possess large sabre-shaped ovipositors. A slit, half an inch deep and more than two inches long, had been cut into the hard wood, in which the eggs had been symmetrically deposited, edge to edge, with the coloured part inwards. The greater part of each egg was of fine texture, and coloured green; but at the extremity from which the young insect would make its exit the egg shell was soft, pliant, and beautifully reticulated. The row of flattened green eggs lying side by side resemble an acacia leaf, but as they are concealed within the stem the resemblance was apparently without motive. It seemed curious that as the eggs were embedded they should be brightly coloured. Mr. McLachlan and Dr. Sharp made some remarks on the subject. Mr. Green read a short paper entitled "Notes on *Dyscritina longisetosa*, Westw." He remarked that drawings of the species had been exhibited by him at a recent meeting of the Society. Dr. Sharp said Mr. Green seemed to think that the insect was an earwig, but he could not accept it as belonging to the Forficulidæ. He thought that further specimens for examination were required before attempting to determine its position, which was quite doubtful at present. Mr. W. F. H. Blandford communicated a paper entitled "Descriptions of New Oriental Scolytidæ."—H. Goss, *Hon. Sec.*

South London Entomological and Natural History Society.—*Annual General Meeting.—Jan.* 23*rd*, 1896.—T. W. Hall, Esq., F.E.S., President, in the chair. The Reports of the Council and Treasurer were read, and showed that the Society still maintains its very satisfactory condition, both numerically and financially. The election of Officers and Council for the ensuing year then took place as follows:—President, R. South, F.E.S.; Vice-Presidents, C. G. Barrett, F.E.S., T. W. Hall, F.E.S.; Treasurer, R. Adkin, F.E.S.; Librarian and Report Secretary, H. J. Turner, F.E.S.; Curator, W. West; Hon. Secretary, Stanley Edwards, F.L.S.; Council, C. A. Briggs, F.E.S., J. H. Carpenter, John T. Carrington, F. W. Frohawk, F.E.S., W. Mansbridge, F.E.S., W. A. Pearce, and H. A. Sauzé. The President then read his Address, which comprised a short *résumé* of the Society's history; notices of the additions to the British insect fauna; an obituary of the year; an epitome of the Society's work during the year passed; and other matters of general interest. Mr. Tutt, on behalf of Mr. W. E. Butler, of Reading, exhibited specimens of *Argynnis latona*, L., said to have been captured in Devonshire by Mr. B. Stafford Chope, and showed from documentary evidence and other circumstances the great improbability of their being of British origin. At the close of the meeting the President announced the munificent donation, by Mr. C. A. Briggs, of the Herbarium which had been formed by the late Mr. W. H. Tugwell.

February 13*th*.—R. South, Esq., F.E.S., President, in the chair. Mr. Tolhurst, of Beckenham; Mr. E. Montgomery and Mr. A. Montgomery, of Ealing, were elected members. Mr. McArthur exhibited a very long series of *Triphæna comes*, Hb., from Hoy, all of them being referable to the var. *curtisii*, Newm., but without black suffusion of hind wings; also a number of extinct, rare, and unique species and specimens of British Lepidoptera, including a series of *Chrysophanus dispar*, Haw.; a pair of *Lasiocampa ilicifolia*, L., two completely banded and one with yellow ground; *Abraxas grossulariata*, L.; the two Killarney specimens of *Notodonta bicolor*, Hb.; the original specimen of *Nyssia lapponaria*, Bdv.; two *Synia musculosa*, Hb.; the specimen of *Hadena peregrina*, Tr., from Lewes; three *Caradrina ambigua*, Fb.; one *Xylina lambda*, Fb. (var. *zinckenii*, Tr.); three *Ophiodes lunaris*, Schiff., one of which was a beautifully-banded var.; the unique *Catocala electa*, Bork., taken by Mr. Vine; one *C. fraxini*, L.; and a series of *Eupœcilia gilvicomana*, Zell. Mr. Adkin exhibited a specimen of *Cucullia gnaphalii*, Hb., bred by the late Mr. Tugwell. Mr. Sturt, specimens of *Sphinx convolvuli*, L., bred from Cornish larvæ. Mr. Frohawk, the contents of a pheasant's crop, consisting mainly of the larvæ of the Dipteron *Bibo marci*. Mr. Moore, an Ichneumon, with an extremely long ovipositor, from the Upper Amazon. Mr. Auld, a bred series of *Tortrix cratægana*, Hb., from the New Forest; the pupæ were found spun up in leaves of buckthorn under oaks. Mr. Carpenter, a very large number of *Argynnis paphia*, L., and its varieties. Mr. South, a number of Argynnidæ from the Palæarctic region; and read a paper on "The genus *Argynnis*, with particular reference to pale-spotted aberrations. A long and interesting discussion took place as to the cause of this variation.

February 27*th*.—The President in the chair. Mr. A. H. Waters, B.A., of Cambridge, and Mr. J. A. Lucas, B.A., of Kingston-on-Thames, were elected members. Mr. R. Adkin exhibited specimens of *Hybernia leucophæaria*, Schiff., from Abbott's Wood; the pale and dark-bordered were found in equal proportions, and only one black specimen was taken. Mr. Short, a bred series of *Acronycta myricæ*, Gn., with a Dipteron and a series of hymenopterous parasites on its larvæ. Mr. Billups recognised the latter as *Ichneumon fuscipes*. Mr. Dennis, two living females of *Vespa germanica*, taken in February. Mr. Perks, two living specimens of *Rhagium inquisitor*, L., from Epping Forest. Mr. McArthur communicated notes on the occurrence and life-history of *Coccyx cosmophorana* and *Retinia resinella*. He said that the former was always more or less common at Rannoch, where the latter was unknown. As far as he had observed, the larvæ of the former did not in Scotland feed in the way described by Kaltenbach. He was convinced that the larvæ did not normally feed on the refuse of *R. resinella*, but that it did so at Forres he was perfectly certain. A long discussion ensued, during which it was suggested that *R. resinella* had not abstracted all nourishment from its food, which was hence available for pabulum for *C. cosmophorana*, and so presumably the latter species had different habits in different districts. Mr. Billups then read a paper entitled "Hymenopterous and Dipterous Parasites, reared by members of the Society during 1891 and 1892," and exhibited in illustration a large number of species, with the hosts they had preyed upon.

March 12*th*.—The President in the chair. Col. Partridge exhibited bred specimens of *Phigalia pedaria*, from Epping, of a unicolorous grey with dark nervures; a specimen of *Agrotis puta* having alternate dark and pale bars; and the specimen of *Hadena albifusa* taken by him at Portland, Aug. 15th, 1888. Mr. South, bred specimens of *P. pedaria*, from a black female taken at Macclesfield. The males were nearly of the same form as those of Col. Partridge, but most of the females were black. Mr. Adkin, specimens and sections of the nodules of *Retinia resinella*, to illustrate remarks made at the previous meeting. Mr. Frohawk, bred male and female of *Nyssia lapponaria*, the ova having been obtained from Mr. Christy; the female was alive. Mr. West, of Greenwich, a female *N. hispidaria*, taken in West Wickham woods. Mr. Lucas, a carding spider, taken at Hampton Court. Mr. Barrett, series of various species of the genus *Dianthœcia*, from his own collection, including *D. carpophaga* and *D. capsophila*, from various British localities; *D. barrettii*, with continental *D. luteago* for comparison, and the only known Welsh and English examples;* *D. cæsia*, with continental forms for comparison; *D. albimacula*, from Dover, Folkestone and Portsmouth; two drawers from the cabinet of Mr. Sydney Webb, containing the same species, and including the two *D. compta* from the late Mr. Bond's collection. Mr. Adkin also exhibited series of *Dianthœcia*. In the discussion which ensued, Mr. Barrett considered *D. carpophaga* and *D. capsophaga* as one and the same species; he was convinced that *D. barrettii* was but an extreme local form of the continental *D. luteago*, and felt almost inclined to say that there never was a British specimen of *D. compta*. Messrs. Adkin and Tutt preferred to consider the first-named as closely allied species possessing extreme parallelism in their range of variation. Mr. Hall said that he always found *D. carpophaga* larvæ on *Lychnis vespertina* and scarcely any on *Silene*. Various members testified as to the doubtful origin of British *D. compta*. Mr. McArthur gave instances of how *D. conspersa* always resembled the colour of rocks or walls on which it sat in various districts. Mr. Tutt said that *D. cucubali* was the only member of the genus which came to sugar, and that it was also double-brooded.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*December* 16*th*, 1895.—Mr. Geo. H. Kenrick, F.E.S., in the chair. Mr. J. T. Fountain, 58, Darwin Street, was elected a member of the Society. Exhibits:—By Mr. R. C. Bradley, fine specimens of *Æschna juncea* and *Æ. grandis* from Sutton Park. By Mr. Kenrick, a few Lepidoptera taken during a short trip on the Norfolk Broads. He had gone in a wherry, and collected chiefly by means of light from the boat; amongst the things taken by this means were *Leucania albipuncta*, *Nonagria despecta*, and *Calamia phragmitidis;* he also tried sugar with poor results, the best take being *Apamea fibrosa*. He also showed a pair of small dark *Plusia festucæ* he bred from larvæ found there.

January 20*th*, 1896.—Mr. P. W. Abbott, V.-P., in the chair. Exhibits:—By Mr. Abbott, *Notodonta dodonæa* from Wyre Forest; a fine dark female *Nonagria typhæ*, one of two bred from a large number of pupæ taken in Norfolk by himself and Mr. Hodges last year; also pale male *Odonestis potatoria*, also from Norfolk, only a little darker than normal females. By Mr. R. C. Bradley, *Erigone vagans*, a handsome Tachinid, which he took in Sutton Park in June, 1885, flying round the pines in company with great numbers of other insects; there were many Tipulidæ, bees, &c., and the flowers seem to have been quite deserted for the pines. He believed the attraction to have been the resinous exudation, as he could find no trace of honey-dew or other likely attraction. By Mr. Wainwright, Micros, including *Stenia punctalis* from Boscastle, Cornwall. By Mr. Martineau, six cases of Hymenoptera from his collection, containing many fine and interesting things.

February 3*rd*.—*Seventh Annual Meeting*.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. C. A. E. Rogers, of 31, Hall Road, Handsworth, and the Wells House, Malvern Wells, was elected a member of the Society. The Annual Reports of the Council, the Treasurer, and the Librarian were presented, and were duly received. The following were elected as Officers and Council for the ensuing year: as President, Mr. G. H. Kenrick; Vice-President, Mr. G. T. Bethune-Baker; Treasurer, Mr. R. C. Bradley; Librarian, Mr. A. H. Martineau; Honorary Secretary, Colbran J. Wainwright, 147, Hall Road, Handsworth, Birmingham; remaining members of Council, Messrs. P. W. Abbott, W. Harrison, E. C. Rossiter, and G. W. Wynn. Exhibits:—By Mr. J. T. Fountain, a beautiful specimen of *Arctia caia*, all the red being replaced by cream colour, and the white of fore wings much extended; also one with the dark colour much extended. By Mr. P. W. Abbott, a row of *Mamestra furva* from Bay of Nigg, N.B. By Mr. W. Harrison, some nice *Catocala sponsa* from the New Forest. By Mr. R. C. Bradley, three species of *Loxocera*, a series of *aristata*, Panz., a pair of *albiseta*, Schrank., and a pair of *sylvatica*, Meig., all from Sutton, *L. sylvatica* being quite new to the British list.

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* Some doubt was expressed, after the meeting, as to whether the Welsh and English specimens in the series of *D. barrettii* were really referable to that species.—Ed.

February 17*th*.—Mr. A. H. Martineau in the chair. Mr. Kenrick having again expressed his inability to accept the presidency, Mr. G. T. Bethune-Baker was re-elected President, and Mr. P. W. Abbott, Vice-President. Exhibits:—By Mr. R. C. Bradley, a specimen of the rare *Xanthogramma citrofasciata* from near Droitwich. By Mr. J. T. Fountain, nice variable series of *Bombyx quercus*, *Odonestis potatoria*, and *Abraxas grossulariata;* the *potatoria* were from Droitwich, and the males showed a tendency to paleness, one approaching the females closely in colour; one *grossulariata* had almost lost the black markings on the hind edge of the hind wings; it was one of a brood reared on *Pyrus japonica*, all of which were pale; others he reared on hazel came out dark. By Mr. W. Bowater, *Sesia scoliiformis* from Killarney; also a pupa-case of *Zeuzera æsculi* found in a sallow in his garden at Edgbaston. By Mr. Wainwright, a number of rare Diptera, *Cheilosias* &c.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

Handbuch der paläarktischen Gross-Schmetterlinge für Forscher und Sammler. Von Dr. M. Standfuss. Jena: Gustav Fischer. 1896.

The author of this important work has had two distinct purposes in view: the first being to provide a full practical guide for the collector of butterflies and the larger moths; the second to infuse some scientific spirit and interest into the work of collecting, by showing from his own observations and experiments how much light may be thrown, by a practical entomologist working on good lines, upon some of the most doubtful and difficult problems of biology. There can be no doubt that Dr. Standfuss has amply succeeded in demonstrating the importance of entomological evidence in the vexed questions concerning heredity, the origin of variations, and the general laws of species-formation that have been for long, and are still, so keenly debated; and if his numerous carefully-planned and elaborately carried out experiments should fire other entomologists with the desire of emulating his achievements, the book will have performed a great and lasting service to the cause of science. Dr. Standfuss's experiments, the main results of which are illustrated by a series of excellent coloured plates, some of which reach a very high standard of beauty and accuracy, are chiefly concerned with the subjects of hybridisation and of the alterations produced in the perfect form of insects by the exposure of their immature stages to abnormal physical conditions, mainly those of temperature. There can be no two opinions as to the industry and thoroughness with which the author has addressed himself to the task, nor will there be any question that the results he has obtained and recorded are in the highest degree interesting and valuable. It is equally certain, however, that his interpretations of the facts will be in many quarters vigorously called in question, as will appear when we mention that he upholds the doctrine of the transmission of acquired characters (pp. 336–344), and that he is disposed to minimise the value of natural selection in species-formation (pp. 286–292, 3). It would be beside our present purpose to enter into a criticism of our author's views on these points; we will simply content ourselves with remarking that he does not seem to us to have shown that the characters impressed upon individuals by direct action of the environment are capable of transmission, unless in the limited sense allowed by Weismann ('The Germ Plasm,' 1893, p. 401), which, strictly speaking, does not involve heredity at all. We may say also in passing that we cannot help thinking that a careful consideration of the phenomena of insect-life in other regions than the palæarctic—say the neotropical—would lead him to adopt a somewhat more sympathetic attitude towards the question of mimicry than that expressed on pages 295, 296. Be this as it may, the experimental portions of the work form a storehouse of valuable material; and the author certainly deals fairly with his readers by presenting the evidence he has collected in a full and unmutilated condition.

English entomologists will be pleased to find that Dr. Standfuss cordially recognises the value of the work of Mr. Merrifield, much of which in many respects anticipated his own. The remarkable results obtained in this country by the last-named investigator with various members of the genus *Vanessa* and other Lepidoptera by exposure in the pupal stage to abnormal conditions of temperature, were unknown to Dr. Standfuss until the close of his own experiments; and the fact that the independent descriptions by each author of the effects produced are so closely correspondent, forcibly testifies to the accuracy of the observations of both.

We note that Dr. Standfuss, though he is firmly convinced that both heat and cold are capable, in different species, of inducing reversion, does not allow that this result may follow the application of either heat or cold in the same species. Reasons for thinking that, in some cases at any rate, the changes produced in the same species by both raising and lowering the temperature are reversionary, have been put forward by the present writer; and Dr. Standfuss does not give us his grounds for declining to accept them. The author's speculative views as to the phylogenetic and distributional history of the Vanessas and other groups are always interesting, and often convincing.

The practical portions of the work, which are in most respects a reissue of the author's former 'Handbuch für Sammler der europäischen

Gross-Schmetterlinge' published at Guben in 1891, form a complete and useful guide for the continental collector, and *mutatis mutandis* would supply valuable hints to the field entomologists of our own country. Among the subjects dealt with in a more or less original manner are the various modes of larva-collecting by searching, beating, sweeping, the laying down of dry foliage, &c. Under the heading of the perfect insect we have sections devoted to nets, killing-bottle, collecting-boxes; mallet for jarring tree-trunks; methods of collecting by smoke, light, and baits; the packing, pinning, and setting of captures. Good practical directions are given for the rearing of larvæ in all their stages indoors or in the open, with fairly full accounts of the diseases to which both larvæ and pupæ are liable. Useful hints are added as to the management of such species as hybernate in the larval or pupal condition, and as to the precautions to be adopted against the attacks of "cannibals."

The author has also much to say with regard to the care of the collection itself, nor do such details as the subjects of purchase and exchange, the arranging and labelling of specimens, and the keeping of a memorandum-book and register, fail to find mention in their appropriate place. The advice given throughout is of a sound and practical character, and the author commands the greater confidence in his recommendations from being able to appeal at almost every turn to the results of his own experience. We take leave to differ from him on one minor point. He deprecates the waste of time, as he considers it, involved in making a separate record of each individual specimen in the collection. We hold, on the other hand, that it is most important to be able to give the exact date and locality of each capture when required, together with any other points of interest that may have been observed in connection with it at the time. Such facts often turn out to have a quite unexpected bearing on some question of biological interest, and their systematic record adds enormously to the scientific value of the collection.

We cannot close our notice of this stimulating book without bestowing a special word of praise on the coloured figures, which, excellently drawn by L. Schröter and worthily reproduced by the well-known firm of Werner and Winter at Frankfort, are both good in themselves and really useful as illustrations of the text. Those that especially take our fancy are the hybrid Saturnias, with their larvæ, Plates I.–IV. The Vanessas on Plates VI. and VII. are most interesting, and should be compared with Mr. Frohawk's figures accompanying Mr. Merrifield's papers in the London Entomological Society's 'Transactions.' There is, we think, an inaccuracy in Plate VI., fig. 4. The last of the chain of pale submarginal spots should belong to the space between the first and second median branches; not, as here represented, to the space between the median and submedian nervures.

The book would be improved by a good subject-index, for which the fairly full table of contents at the beginning, and the alphabetical list of genera and species at the end, are a not quite adequate substitute. It is to be hoped that this want may be supplied in the future editions, for which the high merits of the work are likely to ensure a demand.

F. A. D.

THE ENTOMOLOGIST

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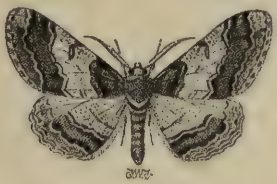
BOARMIA CINCTARIA, Ab.



The above figure represents a beautiful aberration of *Boarmia cinctaria*. In the strongly contrasted coloration it bears a close resemblance to the striking banded forms of *Hybernia leucophearia* var. *marmorinaria*.

The primaries have the basal and marginal areas of a dark dusky brown; the median band white, slightly streaked with brown, and the usual central oval black marking; the secondaries are similarly coloured, having the basal half and apical portions white dusted with brown.

The specimen was captured in the New Forest in 1893, and is in the collection of Mr. Joseph H. Carpenter, to whom I am indebted for the loan of it for figuring.

F. W. Frohawk.

BROCKENHURST REVISITED.

By the Rev. O. Pickard-Cambridge, M.A., F.R.S., &c.

Few spots have been less transformed by the march of events than a portion at least of the old entomological collecting ground at Brockenhurst in the New Forest. This came as a pleasant surprise to me on going over the well-remembered spot during the past summer. I had heard, since my early visits, that numbers of the old oaks in the fine forest-grove leading towards Lyndhurst had disappeared, and that I should find it all changed for the worse. My first visit was in June, 1854; my concluding trip there at that epoch was in June and July, 1857. My surprise therefore in June, 1895, was only equalled by my gratification at finding, with scarcely an exception, every well-remembered tree, nook, and glade just as they were at those early dates. There were the old, almost jet-black "sugaring" patches on the identical tree-trunks; the smooth closely-cropped "lawns" melting away into the dense undergrowth of bracken, over which the broken sun's rays dropped in chequered sheen. I almost expected to see the ever-welcomed sight of my old friend and companion in those visits, Frederick Bond, clad in an old brown-holland jacket, a short umbrella-net in one hand, and a six-foot beating-stick in the other, hammering away at the oak-trunks and lichen-covered limbs, and to hear his cheery voice asking, "Have you got any more *viduarias?*" Those were indeed pleasant days—with a growing collection of Lepidoptera to be worked for, in a locality of traditional entomological richness, and in company with one of the heartiest, most unwearied, and most unselfish of collectors.

Circumstances prevented my visiting those parts again until the past year. I believe Mr. Bond worked on there again at intervals for a time, though I fancy his subsequent work in the New Forest lay in the more immediate neighbourhood of Lyndhurst, where, indeed, I myself worked for some weeks during the summer of 1858, but not with Mr. Bond. I understood, when there last summer, that this particular Brockenhurst locality has now become chiefly the hunting-ground of the railway-excursionist collectors, school-boys, "goodness-gracious" young ladies, and such like entomological aspirants. One of the first human beings I saw during a twilight stroll through the old ground was a well-remembered form (only differing by the accretion of the forty odd years), pioneering two ladies and a gentleman, whose movements and methods betokened the diurnal and macro-lepidopterous state of mind. My old friend (I call him *friend*, for all collectors are, or ought to be, friends, though at that time I only knew him by name and sight) was the bearer of a huge net for beating larvæ into, and also of the usual "sugaring" materials. I recognized him (though he did not recognize me), and asked him what sport? "*None!* nothing out scarcely! One 'crimson' by some other lucky party last night." He bewailed by their trivial names various of the old stock insects that used to be got there; and especially the absence or rarity for several years past of *Dicycla oo*, which he told me occurred there in the greatest profusion some years since, one collector taking upwards of two hundred. This was new to me, for during my visits Bond and I both took it but rarely. I asked him if *Cleora viduaria* was ever taken there now, but neither by this name, nor by its trivial name "the pretty widow," nor by the description I gave him of it, did he know of its having occurred there. I subsequently heard from a local collector there, Mr. C. Gulliver, that it had not been taken for a great many years. It was unknown to the latter, and, indeed, he did not know the exact locality where it used to occur, nor the method of working for it. This I suppose accounts for the long price that this pretty moth fetches when now brought into the market; but I would ask whether any serious collectors do now ever work for it in the right place, in the right way, and at the right time? The spot where I and Bond took it in tolerable abundance appeared to me to be quite unaltered, with nothing so far to lessen the likelihood of its occurring there now; and its food (supposed, I believe, to be the lichens on the old oaks) is certainly still in abundance. Yes, the days of the "pretty widow," and "Jephtha's daughter," the "scarce marvel du jour," *Triphæna subsequa* (with a long *e*, after old Charles Turner's rendering of it), and many more, were pleasant days; but if the "pretty widow" be no longer there, the pleasure of those days can, in their fulness, of course, never more return. Still I think she can only be in hiding! *this*, however, is not, I fancy, generally considered to be the habit of those of whom the sapient Mr. Weller bid Samivel "beware!" During my first visit to the Forest, in June, 1854, I met with two specimens of *Cicada hæmatoides*, and another, or others, were taken by Mr. Bond, all on the wing in bright sunshine among the fern (bracken). Whether or no this was its first occurrence in England I cannot say. The authors of 'The New Forest,' Rose C. de Crespigny and Horace Hutchinson (London: John Murray, 1895), p. 278, state that this insect "was first taken in the Forest by the late Mr. Farren in 1858," which is manifestly a mistake. At p. 275 of the same work it is also stated that "one hundred and twenty-five specimens of *Triphæna subsequa* were captured in one season" [year not mentioned] "by Mr. Gerrard of Lyndhurst." Was this, I wonder, ever recorded in any of the entomological periodicals? We also read there that the natives of the Forest style "the man with a butterfly-net a bug-hunter!" I have usually heard entomologists called by country people in

England generally, and in the Forest certainly, "flycatchers," but never a "bug-hunter"; the Americans call him a "bug-sharp!" In the same work, at p. 268, it is said, "The greatest find ever made in the Forest was the *Niobe* fritillary, in 1869, by Mr. Gerrard." Was not the so-called *Niobe* afterwards ascertained to be only a variety of *A. adippe?*

I have mentioned above the name of Charles Turner,—probably not many entomologists of the present day were acquainted with him. His was a well-known figure during the "fifties" in this part of the New Forest, where he was usually known as "the Grasshopper," and a most hard-working, acute, and successful collector, chiefly of Coleoptera. He did, however, a fair amount of work among Lepidoptera. His only sleeping-place for weeks together was a ruined, open shed under the plantation on the right hand going from Brockenhurst to Lyndhurst. Here he would lie down for a few hours after sugaring, and be about again beating for larvæ at daybreak. As soon as funds ran short he would pack up his collections and take them to London, where they were eagerly hailed by many well-known entomologists, and met a ready sale at good prices. In all his entomological work Turner was thoroughly trustworthy; I never heard even a suspicion raised as to the genuineness of any of his New Forest rarities. I have heard of his receiving as much as thirty or forty sovereigns for one cargo of insects. On this money he would revel in London until it was spent, or he was robbed of it, and then back to the old work in the Forest with as great zest and love for it as if his insects had been duly stored in a private cabinet awaiting his fresh additions; he indeed loved the work and the open air and surroundings of the Forest in a truly remarkable degree, and quite apart from its being his means of living, or the high prices he got for his captures,—I have myself known him to get 15s. each for a dozen *Triphæna subsequa* (considered a heavy catch of that moth in those days). He was, however, very close and wary as regards divulging the localities of his insects, which is not to be wondered at, as his livelihood depended on keeping them to himself,—some of his localities for rare Coleoptera have, I believe, never been since discovered. He also had his own ideas of the laws and customs of "collecting." On one occasion three of us had just sugared in the rides in the plantation at the top of the rising ground on the right hand between Brockenhurst and Lyndhurst, and were waiting about until dark enough to light our lamps, when, more than half tipsy, "the Grasshopper" came up, gesticulating, and threatening to prod out every eye amongst us with the sharp end of his net-stick—a formidable ashen staff of at least six feet long—because we had, he said, taken possession of his rides. Argument was useless; no one had been on the ground during the whole of the afternoon and evening but ourselves, and there was nothing to prevent our working there for the night; but it appeared that he had worked there the night before, and so claimed to keep everyone else out of these rides as long as he chose. The noise of the strife soon attracted several other collectors from a distance, and the row became worse and worse. Just at this juncture up came one of the Forest plantation keepers and tried to quell the disturbance; but after some fruitless expostulations, and bewailing the mistake he had hitherto laboured under, that we "flycatchers were a peaceful set of beings," he suddenly asked what right any of us had in the plantation, inasmuch as those portions of the Forest were specially closed to the public by the "Ranger's orders," and he added that he must beg all who had not a special written permission from the Deputy Ranger to clear out of the enclosure forthwith. This stopped the babel of voices like the falling of a bombshell in our midst, and after a demand for each and all to show his written permission, it so turned out that Turner was the only one out of the ten or twelve collectors then gathered together who possessed the Deputy Ranger's written permit. There was no help for it; we had all to beat a retreat in as dignified a way as we could, leaving "the Grasshopper" in sole possession. The next morning I made it my business to call upon Mr. Cumberbatch, the then Deputy Ranger, living at Lyndhurst; and, after hearing the account of the previous night's occurrence, he gave me a written permission, which I still have in my pocket-book, though I was never again interrupted, and never asked to produce it!

Pleasant indeed it was to revisit those old haunts of forty years ago! I missed the "black-veined white" butterfly, then abundant at that part of the Forest. It is difficult to conjecture even the cause of its disappearance. No tale has ever been told of its merciless extermination by collectors; the whitethorns are there still, the direct descendants doubtless of those among which William Rufus may have ridden in the chase;—some of these said whitethorns are indeed pictures of scraggy, mossy old age and decay, and may well be a thousand years old—why then has *Aporia cratægi* disappeared?

My present visit, however, was not just to go over the old ground for the mere sake of the old associations, nor yet to collect Lepidoptera, but to work for several local and rare spiders, of which my friend, Mr. Cecil Warburton, of Christ's College, Cambridge, had the previous summer come across some stray specimens. After working in the thickest brakes of black and white thorns, at the cost of an umbrella, a net or two, and much damage to our garments, my nephew (F. Pickard-Cambridge) and myself succeeded in finding all but one species during the June visit. The best of these, *Hyptiotes paradoxus*, Koch (only once, before Mr. Warburton met with it, recorded in Great Britain), was not yet in the adult state; a second trip, however, in July, after still harder work, and just on the point of giving it up, I met with adults of both sexes. Another rare and local species, *Epeira angulata*, Clerck, was fairly abundant in the same locality; and, in addition to many other good things, I turned up a pretty little *Philodromus* new to Britain, *P. rufus*, Sim.

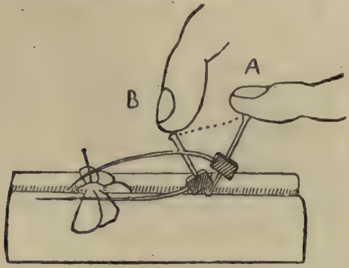
In the July visit we did more among the Lepidoptera, taking some good micros, a few of which are not readily met with elsewhere. Tired out with beating the old thorns and oak-boughs, we (my son, A. W. Pickard-Cambridge, and myself) threw ourselves down on a shady bit of close-cropped lawn on the high ground looking over towards Southampton and Beaulieu. Old gnarled oak-trees stood out on all sides, anything like straight lines being broken by clumps of oak, ash, beech, yew, thorn, and other lesser undergrowth; vistas of exquisite beauty opened out in various directions, such as no landscape-gardener could even dream of, still less achieve; the sun shone brilliantly, the heat was great, but there was up there a refreshing breeze. There we rested, eating our sandwiches, and talking of those ancient times when, may be, down that very bit of lawn, William Rufus and his followers in hot pursuit of deer may have ridden. No sound was to be heard excepting the hum of the humble-bee, the chirp of the grasshopper, and the gleeful clapping of leafy fingers among the trees; no human being was in evidence any more than if none existed in the country. Well! we did not see either the red king or his ghost, nor yet any of the deer descended from his herds—more's the pity that they are all gone; but as we sat and munched and talked and pondered on things new and old, an old fox trotted out close in front of us, and cantered leisurely down the lawn and away. The conclusion was not sublime certainly, still less was it ridiculous: we laughed! I jumped up hastily: "Oh! oh! goodness gracious! murder! thieves!" No, not thieves, only emmets! I had been sitting on what I thought a deserted emmet nest; but the spell of my presence, or the attraction and weight of my person, had called up an unseen host from subterranean regions, and I was covered with the little tickling rascals.

Yes, those were pleasant days there forty years ago, and more than pleasant to revisit the old spot, and to experience in even a greater degree than ever the anticipations, fulfilled and unfulfilled, the excitements, and the satisfactions of one of the most absorbing of earthly pursuits, Entomology, pursued in one of the grandest of British localities, the New Forest.

Bloxworth Rectory.

"SPANNERS" OR SETTING BRISTLES.

By H. Guard Knaggs, M.D., F.L.S.



"Spanners" are invaluable to the collector for the purpose of setting out Lepidoptera, an operation which they greatly facilitate. Their use is, firstly, to assist in getting the wings into position; and secondly, to hold them in their place until suitable braces have been applied. The instrument under the finger at A in the figure will give an idea of what a spanner is, and how it is put together, thus: a stout pin is passed through one side of a quarter-inch cube of silver cork, or cork carpet, so as to come out on the opposite side, and is then withdrawn in order to allow of the insertion of a bristle, represented in the figure by a cat's whisker, the last quarter inch of the thick end of which has been twice dipped in varnish in order that it may be firmly fixed in the cube; a pin (a bead-headed steel toilet-pin being neatest and most convenient) is then driven through two other opposite sides of the cube, crosswise to, and at an angle slightly obtuse to, the bristle, care having been taken that the concave curve of the latter faces downwards.

Nothing, so far as I know, has yet been introduced as a spanner to beat the well-formed whisker of an old tom cat. It was, I believe, the invention of my old friend Bond; it superseded bristles and fibres from brooms and brushes, and cut quills (excepting for the larger insects), and has been adopted by most of our best collectors during the past half-century. About forty years ago my old friend Fereday tried to persuade us to use a fine "beading-needle," as fine as a hair, but its action was comparatively harsh, and the material was not sufficiently flexible and springy, so that it did not catch on.

The qualities desirable in a spanner are roundness, smoothness, and flexibility with stiff springiness; the cat's whisker not only possesses these in high degree, but is so graduated, in thickness and strength, that, within certain limits, any required pressure can be applied at will, from the gentlest touch of the point to the most delicate micro, to the firm grip, by the stouter portion, on the wings of a good-sized insect. Its manipulation, of course, like everything else, wants a little judgment and practice, but proficiency is easily acquired, after which, use becomes second nature, and we henceforth swear by the smeller of grimalkin.

The action of the spanner is as follows:—Having the specimen we desire to set in a lissome condition, properly pinned, the thorax and abdomen resting in the groove of the saddle, with the legs placed in position, and the shoulders of the wings, when depressed, all but touching the surface of the cork or cork carpet, the bristle of the spanner is held over the wings of the left side, the point of the pin being steadied in the saddle behind the insect, as near to the groove as possible, the tip of the bristle resting in front, so that the spanner is parallel with the body of the insect; then the finger (at A in the figure), placed lightly on the pin-head, is advanced towards B till the fore wing is pressed nearly but not quite on to the cork, while by gentle leverage and pushing by means of a setting-needle with the point placed under the fore wing (generally a darning-needle stuck eye foremost into an inch or two of penholder), the wing is got up to its proper level; the finger now advances towards B again, and simultaneously the pin-point is pressed a little way into the cork of the saddle—this action grips the costa of the fore wing and holds it in position; lastly, the hind wing is pushed into position, the finger again advanced to B, the point of the pin being driven still more deeply into the cork. Thus, as shown in the figure, the wings are held firmly. Of course, if for any reason we require to relax our grip, all that is necessary is to retreat the finger towards A. Operate on the right side of the insect in the same way until the two sides are symmetrical, and the specimen is then ready for the braces, which are merely squarish pieces of tracing-paper of sufficient size to cover the wings and leave a margin for pinning. Transversely ruled paper is of great assistance in getting the wings level, but in the present day most collectors prefer to trust to the eye, having a strong objection to cover their saddles with paper of any kind, believing that it tends to harbour *Acari*, and to prevent the necessary occasional disinfection of their saddles. If the lines could be printed on the bare cork or cork carpet it would certainly be an improvement.

The quills, bristles, and whiskers of the animals at the Zoo have for some time engaged my attention in the hope of finding something to go one better than Tom's whisker, but all I can offer in the way of advance is that the whisker of the common seal is admirably adapted for setting large things, as also is the stout end of a lion's whisker, the thin end does for smaller things. I have a few lion's and tiger's whiskers by me, and propose to make them up into spanners, a sample of which I shall be happy to forward, so long as my stock lasts, to anyone who will send me a stamped directed envelope within the present month—May.

London, April 18th, 1896.

NEW EXPERIMENTS ON THE SEASONAL DIMORPHISM OF LEPIDOPTERA.

By Dr. August Weismann.

(Translated from the German by W. E. Nicholson, F.E.S.)

(Continued from p. 113.)

IV. Experiments with Pararge egeria and meione.

The satyrid, *Pararge egeria*, L., which in our woods has two quite similarly coloured broods, occurs, as is well known in the South of Europe, in a golden-brown form instead of the whitish-grey form, which has been described as var. *meione*. Both forms are figured in my old paper of the year 1875, on pl. 2, figs. 23 and 24; and it is, indeed, also stated there that the extreme *meione*, as it occurs in Corsica, Sardinia, and Sicily, is connected with the German *egeria* by an intermediate form, whose habitat is on the Ligurian coast, and which, indeed, is considerably yellower and darker brown in colour than *egeria*, but yet has not the complete brilliancy of the Sardinian variety.

It was a question with me to know, whether both these forms are wholly temperature forms in the sense that one owes its appearance to the direct influence of the southern heat, *which at present exists*, the other to the influence of the northern tempered warmth, *which at present exists*. If this was the case, then a brood of *meione* reared under the cooler German climate must produce the German form of the species *P. egeria;* and, on the other hand, a brood of German *egeria* reared in the south must produce the golden-brown butterfly of the var. *meione*. But if the influence of the climate is such, that it alters the germ, then the experiment must give another result; the golden-brown variety of the south must still always exhibit in its progeny the characters of *meione* entirely or in part, although they were reared under a northern sky; and, on the other hand, the progeny of the German *egeria* can no more reach the golden colour of the *meione*-form by high temperature during the pupal period.

I have conducted both experiments, and the result was decisive, notwithstanding the many deficiencies, which always attach to such experiments. I regard it, for instance, as one of such, that I was not able to conduct the first-named experiment with the extreme *meione*-form, but with the *meione* of the Riviera, which is less strikingly different from the German *egeria*.

First experiment with egeria.—24 eggs were laid by a female *meione* captured at Genoa, which hatched on April 21st, 1884, at Freiburg, at a room temperature of 17° C. They fed on various grasses (*Triticum repens*, species of *Poa*), and were placed on a *Poa* grown in flower-pot covered with a bell-glass, and kept in the room until the first moult. This took place on May 5th and the following days at a temperature of only 10° C. As soon as the weather became warmer, the larva-cage, in which the young larvæ were now being reared on living grass with free access of air, was brought into a well-lighted but cool cellar, where the temperature was always 12·5–14° C. Strictly speaking, the rearing might have been carried on at the actually prevailing heat of 25–27° C., to which, indeed, our indigenous *egeria* are subjected; but the other method was chosen, in order to obtain as distinct a result as possible.

The larvæ grew very slowly; they were only 12-13 mm. long on May 28th, and their pupation took place between June 17th and 25th. They produced 15 pupæ, which were left in the cellar at a maximum temperature of 14° C. Shortly before emergence the temperature rose somewhat, but only up to 17–19° C., consequently far from our highest summer temperature. There emerged:—

On July 12th, 1 butterfly.
,, 13th, 5 butterflies.
,, 14th, 5 ,,
,, 15th, 2 ,,
,, 17th, 3 ,,

Altogether 16 butterflies:

8 of them males and 8 females, all smaller and less brightly yellow than those which had been captured at Genoa in March and April, but all at the same time distinctly more brownish in the ground colour and yellower in the spots than specimens captured at Freiburg or elsewhere in Germany. There is no doubt but that a brood of *egeria* from Germany would have produced *paler* butterflies, if they had grown up under closely similar conditions. But the force of this argument is still stronger from the following experiment.

Second experiment with egeria.—From 20 eggs of an *egeria* from Zürich, which were laid on May 20th, 1886, there emerged 20 larvæ at 19° C. on May 30th, which on May 31st were placed on living grass in a hot incubator at 25–27° C. On this account the larvæ were very active; they ate much and grew rapidly, so that they had all got over the first moult as early as June 1st. The temperature was not always quite constant, but sank on June 5th to 24° C., then rose again on June 7th and 8th to 25° C., and remained so. On June 9th the larvæ measured 1·5 cm.; on June 13th the largest was 1·8 cm. I found three pupated on the 18th, three more on the 21st, one more on the 24th, and the last on the 25th. On June 5th, on changing the grass, as it had to be done from time to time, three larvæ remained unnoticed on the old plant, which was placed in the room. They grew up afterwards therefore at the room temperature (18–19° C.), and developed much more slowly than the others. On June 21st, when six of the latter had already pupated, these were only half-grown, and they first pupated on July 2nd. There were therefore reared:—

A. In the incubator, at about 25° C., 9 pupæ.

B. In the room, at about 18° C., 2 pupæ.

The former pupated after 20–27 days, the latter after 34 days. The butterflies emerged:

From A, in the incubator, at 27° C.:—

On June 27th, 1
,, 28th, 4
,, 29th, 1
On July 2nd, 1 female.
,, 4th, 1
,, 7th, 1

Together 9

From B, at the room temperature:—

On July 12th, 1
,, 15th, 1

Consequently the development from egg to butterfly had lasted 44–47 days at the room temperature (18° C.), and 29–39 days at the higher temperature

The butterflies of Lots A and B are *exactly alike;* neither could be distinguished in colouring and marking from such as were caught in the open.

Result of the experiments with egeria.—The southern form *meione* can, indeed, be influenced by the action of a lower temperature (10–14° C.) in its colouring, and be rendered less brightly coloured; but still they always remain brighter in colour than the northern form *egeria*. On the other hand, a brood of the northern form is not visibly altered by the action of a higher temperature (25° C.). I should have liked to repeat this experiment with a still greater increase of the temperature up to about 35° C., but hitherto I have not accomplished it. Nothing, however, in the main result would be altered by this.

V. EXPERIMENTS ON THE EFFECT OF VARIOUSLY-COLOURED LIGHT ON THE PUPÆ OF LEPIDOPTERA.

It has already been frequently stated, that the quality of the light exerts a direct influence on the colours of butterflies. Now, although the colour-decoration of a butterfly is ready, when it breaks through to the light from the dark pupal integuments, yet it seems to me worth the trouble of testing by experiment the opinion, which might be held, that light influences the formation of colour in the wings of butterflies through the pupal integuments.

The experiments were carried out ten years ago, and their purely negative result made a description of them appear to me superfluous. I describe them solely that this question may be set at rest; and I do so, although I now see that Dr. Standfuss has undertaken and published similar experiments, in which the result was likewise negative.*

Experiments with Vanessa cardui, 1884.—A female of *V. cardui*, captured in the open near Freiburg, laid numerous very small green eggs on a thistle on May 27th, 1884; they were all laid singly on the under side of the leaves and on the stem, but often several (up to nine) scattered on the same leaf.

The emergence of the larvæ took place between June 4th and 6th, with exclusion of the light under a black bell-glass. The larvæ which had emerged were then divided into three groups, the first of which remained in darkness, the second was reared under blue light, and the third under yellow light.

All of the third group escaped through an opening, and had to be replaced by five larvæ from the first group on June 19th; and, as these died in the yellow light, they were again replaced on June 21st by some of the first group.

The larvæ of all three groups then developed equally well. All the larvæ of the second group pupated on July 3rd, all but one of the third group on July 4th. The larvæ reared in darkness did not pupate until July 8th. However, this cannot be attributed to the light without further proof; it was rather only a result of worse, *i. e.* slower, nutrition. The box, in which this group was reared, was, indeed, only closed by its lid, and not with a glass plate, as in the second and third experiments. To be sure, a thick cloth lay over this, but still the evaporation was great, and caused the food-plant to dry rapidly. The renewing of the food-plant, too, always brings about a kind of fast, as the larvæ are very sluggish, and do not readily crawl of their own accord from the withering leaf, although a fresh one lies close by, or even *just over* it. They then, indeed, spin both together, but they eat the withered one again notwithstanding. They are not adapted to a change of food, but to remaining stationary on the same plant. The butterflies emerged—

1st Group, in the dark.	2nd Group, under blue light.	3rd Group, under yellow light.
On July 13th, 2 ,, 15th, 2	On July 9th, 1 ,, 10th, 4	On July 11th, 5 two of which were crippled.

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* Standfuss, Handbuch für Sammler europäischer Grosschmetterlinge. Guben, 1891, p. 119.

These 14 butterflies are not in any way different from other Freiburg *cardui*, neither do they differ among themselves in marking or colour, apart from quite insignificant individual differences, such as are never absent. All 14 have relatively much blue in the eye-spots on the under side of the hind wings.

(To be continued.)

SILK-PRODUCING LEPIDOPTERA.

By Alfred Wailly.

(Membre Lauréat de la Société Nationale d'Acclimatation de France).

In consequence of the enormous losses experienced in the production of the mulberry silk, during a number of years, owing to the various diseases which attacked the *Bombyx mori* worms, the attention of sericulturists of various countries was drawn to several species of wild silkworms of Asia, America, and other parts, and experiments were made in Europe, with more or less success, with the oak silkworms (*Yama-maï* and *Pernyi*) and also with *Cynthia* (Ailanthus silkworm).

The results of these trials were recorded in various papers, and my own reports on the rearing of about twenty species of wild silkworms were published annually, during a succession of years, in the 'Bulletin de la Société d'Acclimatation de France,' Paris; the 'Journal of the Society of Arts,' London; and other publications.

As I stated in an article in the 'Entomologist' (xxiii. 119), four species of wild silkworms with "closed" cocoons can be reared in the open air in Europe, even in northern parts; they all produce excellent silk, which can be reeled like that of *Bombyx mori*, and they are the following:—*Antheræa pernyi* (North China oak silkworm); *A. yama-maï* (Japanese oak silkworm); *A. roylei* (Himalayan oak silkworm); and *Telea polyphemus* (a polyphagous North American silkworm). To these four may be added two other species with "open" cocoons: *Attacus cynthia*, and *Platysamia cecropia* (a polyphagous North American silkworm). But the two species best adapted for rearing in the open air in England and other northern countries are *Antheræa pernyi* and *Attacus cynthia*. Referring to the diseases which attack the mulberry silkworm, I will quote a passage from one of my reports, the one for the year 1883, in the 'Journal of the Society of Arts':—"Worms reared in a state of captivity in warm rooms or 'magnaneries,' as the mulberry silkworm is, are all liable to the terrible contagious diseases which, for years, have attacked the latter to such an extent as to make the supply of mulberry silk considerably smaller than it used to be. In

France, more than fifty years ago, a most terrible disease (which has now, it is said, disappeared) was the 'Muscardine' (a white vegetable parasite which was developed inside the worm or in the chrysalis or pupa. Whilst the Muscardine preyed on the mulberry silkworms, the other epidemics had disappeared; but, from 1845, two other distinct diseases made their appearance one after the other. The first was the 'Pébrine' (pepper disease), a very ancient affection of the worms, which when attacked by it are covered with black spots, and grow smaller and smaller till they die. Later on, a second, very distinct from the first and a worse disease, made terrible ravages among the worms; this is the 'Flacherie.' The Flacherie is worse than the Pébrine, because, after all the expense and the labour of rearing the worms, which eat and grow well, showing apparently no signs whatever of disease, they die within a few days of the spinning period: hence a great disappointment. These diseases may co-exist, but when they are intense it often happens that one excludes the other, according to the ordinary law of epidemics. These diseases, created by the overcrowding of worms in hot rooms, may also be the consequence of rearing from eggs containing the germ of disease; for it must be remarked that a certain number of diseased worms live and procreate in spite of that germ of disease in them. On the contrary, silkworms reared in the open air, on trees, and in suitable climates, are in such conditions of 'hygiene' as to be almost entirely protected from contagious diseases."

The rearing of the best wild silkworms, on a large scale, for manufacturing purposes, should be encouraged in their native countries; for although the species previously mentioned, and some others, might be acclimatized and even naturalized in Europe, yet, they could not, as a rule, be bred in such quantities as in their native countries. Besides, as these wild silkworms, like other Lepidoptera, are reared in Europe by entomologists in order to study the larvæ and obtain fresh specimens of the perfect insects for collections, it will also be a profitable occupation, to entomologists and other persons residing abroad, to rear larvæ of various species for the purpose of sending the pupæ to Europe, as they will always be readily purchased.

With respect to the rearing of the larvæ or caterpillars in their native countries, the best plan is of course to rear them on the trees or their other food-plants, taking care to protect them against the attacks of birds or other enemies. Muslin bags or sleeves may be used to cover the larvæ; but when silkworms are reared on a large scale they have to be watched day and night till they have formed their cocoons, as is done with the *yama-maï* in Japan.

If recourse must be had to cut branches to rear the larvæ, the branches should be large instead of small, the stalks being of course plunged in heavy bottles or jars filled with water. The branches should also be cut in the evening, or at least not when the sun is shining on them, whenever it is possible to do so, because branches or plants cut in the evening will keep longer in good condition; and the foliage on a big branch, being fed partly on the sap, will be more wholesome to the worms than if the branch were cut into a number of small twigs, the foliage on the twigs being too watery. The water in the bottles should also be kept quite pure, the necks of the bottles being stopped so as to prevent any of the droppings of the larvæ or dirt to fall into the water, which would poison the water and then the larvæ. Cut branches should also be kept in the shade.

When breeding-cages are used, they should always be of a large size, and the watering of the foliage (which is sometimes done in hot weather when rearing native larvæ) should be avoided as much as possible. As there is but little evaporation of the water in a breeding-cage, excess of moisture produces a kind of white fungus on the floor of the cage, which is injurious and often fatal to the larvæ. When rearing larvæ that are unknown and may have to burrow into the ground to turn into the pupa state, a few inches of light soil covered with a layer of moss should be put on the floor of the cage. But a few weeks' practice and experience will teach all that is required to be known for the proper rearing of larvæ, according to the circumstances in which one may be placed. Live cocoons and pupæ intended for exportation to Europe should be sent as soon as possible after their formation.

In the list of wild silkworms, it must be remarked that the species of the genus *Antheræa* have "closed" and perfect cocoons, and they are rich in silk. The cocoons of the genus *Actias* also are closed, but most of them are irregular in shape, and they are not so rich in silk as those of the genus *Antheræa*. The cocoons of the genus *Attacus* are "open" at one end, and many of them are rich in silk.

Trusting these few remarks may be of some use, I now give a list of wild silkworms, as far as they are known to me up to the present time.

(To be continued.)

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 124.)

[Hadena genistæ, *Bork.*—Birchall's notice of the occurrence of this species from Wicklow proves to have been based on erroneous information, and this he confirmed by a letter to me.

Mrs. Battersby, of Cromlyn, Co. Westmeath, has a specimen she believes to have been taken there. There is also another rather unsatisfactory record elsewhere, but I think it best to await more satisfactory evidence before admitting the species as Irish.]

Hadena rectilinea, *Esp.*—Killarney, not uncommon (*B.*), and Torc Wood (*W. Salvage*); several specimens near Galway, and one at Clonbrock (*R. E. D.*), which are identical with those from Aberdeen, var. *semivirgata*, Tutt.

Xylocampa areola, *Esp.* — Widely distributed, but rarely numerous. "Common on the Wicklow coast" (*B.*). Some specimens are prettily tinted with rose on the pale markings, and some very dark forms (var. *suffusa*, Tutt) occur. A strikingly pale aberration, freshly emerged, was taken by me at Arklow, having no trace of black dashes or lines. The pale blotches and antemarginal band are of dirty white, showing upon a uniform pale brownish yellow ground. Localities:—Howth (*G. V. H.*), and Phœnix Park (*Halbert*), Co. Dublin; Powerscourt, Greystones, Arklow, Ashford (abundant), Wooden Bridge (*M. F.*), Co. Wicklow; Sligo (*R.*); Clonbrock, three, and Galway, two (*R. E. D.*); Castle Blayney, Drumreaske (abundant), Co. Monaghan; Favour Royal, Co. Tyrone; Belfast, scarce (*Bw. and W.*); Derry (*W. E. H.*), &c.

Calocampa vetusta, *Hb.*—Universally distributed, and generally common in Ireland, and often extremely numerous on ivy-bloom. It varies scarcely at all. The ground colour of hybernated specimens is pale, but autumnal examples are mostly characterised by the ochreous brown of var. *brunnea*, Tutt. The sepia-brown of the inner marginal half of the fore wing is often very intense, as noticed by Guenée of a Scottish specimen (var. *suffusa*, Tutt), but sometimes of light tint, excepting a streak under the orbicular stigma. In these light examples the area between the reniform stigma and anal angle is but slightly darker than the ground colour. Mr. Tutt notes (Brit. Noct. iii. p. 108) that the ashy grey central shade along the median nervure and spreading over the central area of the wing of English examples is almost entirely absent in Irish ones.

Calocampa exoleta, *L.* — This species contrasts curiously with the preceding in its comparative scarcity in Ireland, inversely to the proportion prevailing, I understand, in England. It occurs here and there all over the country, from north to south, and most of the localities given have produced only single or very few specimens. Among the comparatively small numbers which I have come across or examined there is but little variation; the brown shade on the lower half of the fore wing, however, is sometimes but lightly represented. Localities:—Howth (*G. V. H.*); Greystones, Tinahely (*Bw.*), and Arklow, Co. Wicklow; Castle Bellingham (*Thornhill*); Belfast, commoner than *C. vetusta* (*W.*); Ballycastle, and near Derry (*W. E. H.*); Favour Royal, Co. Tyrone; Drumreaske, Co. Monaghan; Enniskillen (*Col. Partridge*); Sligo (*R.*); Crossmolina, Co. Mayo, common (*S. R. F.*); Clonbrock, Co. Galway (*R. E. D.*); Killarney and Kenmare; Glandore, Co. Cork (*D.*); Cappagh, Co. Waterford.

Calocampa solidaginis, *Hb.*—One specimen near Galway in September, 1893 (*R. E. D.*).

Xylina ornithopus, *Rott.* — Generally scarce, but in a few places numerous, as at Ashford, Co. Wicklow. It varies somewhat in ground colour and strength of design. The lightest specimens are whitish, clouded with faint grey shadings, giving a mealy appearance, even the costal black dashes becoming but slightly marked. The basal streak is, however, always distinct and black. The commonest form is of a pale grey, with numerous darker shadings and fine black dashes and lines. The darkest are of a grey ground, with an irregular black central band from costa to inner margin passing between the stigmata, and a waved antemarginal black line. Otherwise as the normal form, with darker shadings, and more pronounced black dashes and markings. Some examples of this form have the lower area of the reniform brownish yellow instead of the pale ferruginous of ordinary fresh specimens. Where abundant, it can be found by searching the trunks of trees in the daytime, and especially those of birch, to the bark of which its colours assimilate admirably. Localities:—Rathfarnham (*Rev. J. G.*), Howth (*G. V. H.*), Carrickmines, Kill of the Grange, Co. Dublin; Powerscourt, Arklow, and Ashford, Co. Wicklow; Cappagh, Co. Waterford; Killarney, not scarce; Glandore, Co. Cork, not scarce; Markree Castle and L. Gill, Sligo; Killynon, Co. Westmeath; Farnham, Cavan; Tempo (*Langham*); Castle Bellingham (*Thornhill*).

Xylina semibrunnea, *Haw.*—The only Irish specimens I have seen are two from near Galway, and one from Clonbrock, which were taken by the Hon. R. E. Dillon. Mr. W. Salvage informs me that when collecting at Rossbeigh, Co. Kerry, at sallow, he met with numerous specimens.

Xylina socia, *Rott.* — "Widely distributed and frequently abundant. I once saw an ivy-bush near Tullamore swarming with this insect" (*B.*). I can endorse this statement; there are few Irish localities where *X. socia* is not to be found. Hybernated specimens are met with on sallow, and the ova so obtained feed up readily on lime. The form most common is that of var. *pallida*, Tutt, of pale ochreous grey, without any very definite markings. More rarely var. *umbrosa*, Esp., is met with, having a dark shading under the stigmata (occasionally suffused to the base), and sometimes a lighter one above. These rarely coalesce, and form an indeterminate median band not reaching the inner margin; and occasionally distinct linear markings are scattered over the wing-area. In no instances have I seen very red forms, but at Clonbrock, Markree Castle, Sligo, and Waterford reddish suffused specimens have been met with. Localities:—Generally fairly abundant in Co. Dublin, as at Carrickmines, Howth, &c.; and similarly in Wicklow, where, as at Ashford and about Arklow, it is numerous. Not rare at Castle Bellingham, Co. Louth (*Thornhill*); Farnham, Cavan; and in Co. Monaghan and Tyrone; Cromlyn (*Mrs. B.*), and Killynon (*Miss R.*), Co. Westmeath; Hazlewood, &c., near Sligo; Crossmolina, Co. Mayo; Clonbrock, Co. Galway, abundant (*R.E.D.*); Rossbeigh (*W. Salvage*) and Killarney; Glandore, Co. Cork; and Cappagh, Co. Waterford.

Asteroscopus sphinx, *Hufn.*—Birchall records it as Irish on the authority of Dr. Ball, but no locality was given. A female was taken by me at Clonlost, Co. Westmeath, on Nov. 4th, 1882. But at Clonbrock, Co. Galway, it occurs rather plentifully, the males coming to light (*R.E.D.*).

Cucullia verbasci, *L.*—Dublin and Wicklow, common (*B.*); Howth (*G.V.H.*) I have never met with the insect.

Cucullia lychnitis, *Rbr.*—Some specimens have been taken by the Hon. R. Dillon at Clonbrock, who has listed them as *C. verbasci* in error. The large wood in the demesne is carpeted very extensively with *Lychnis diurna.*

Cucullia absinthii, *L.*—In his 'Supplementary Catalogue' Birchall mentions the capture of one specimen in 1873, at Cromlyn, Co. Westmeath, by Mrs. Battersby.

Cucullia chamomillæ, *Schiff.*—Dublin and Wicklow, common (*B.*). I can confirm this record. The larvæ are plentiful all along the Dublin and Wicklow coast from Rush to Lambay I., Howth, Kingstown, to Greystones, &c. Kilcornan, Co. Galway (*B.*); Sligo, one (*R.*). The imagines I have bred are extremely dark, some specimens having the area between the elbowed line to the pale basal streaks of a uniform brownish black. In most, however, the ground colour is blackish grey, with black nervures alternating with grey streaks (var. *chrysanthemi*, Hb.). I do not know that the blackish form has been described.

(To be continued.)

NOTES AND OBSERVATIONS.

Small Example of Phigalia pedaria.—I have a specimen of *P. pedaria* measuring only fifteen-sixteenths of an inch in expanse. Is not this exceptionally small for the species? The specimen was taken on a tree-trunk at Walthamstow on Jan. 21st, 1894.—E. Cornell; 14, Wellesley Road, Leytonstone, E., April 15, 1896.

Sesia conopiformis in Britain.—We have been informed by Mr. Dale that the *Sesia* he recorded as this species (Entom. xvii. 245) was wrongly determined, and that so far he has not been able to reconcile the specimen with any known species of the genus.—Ed.

Was Clostera anachoreta introduced?—In Mr. Meyrick's new work I observe that, under the above-named species, the author says:—"Perhaps introduced, but temporarily naturalised in Kent and Norfolk." Will Mr. Meyrick kindly explain how he harmonises this statement with the fact that the original specimens, captured in the larval state at Saltwood, and bred by Mr. Sidney Cooper in 1858, remained in that gentleman's collection as *C. curtula* until after his visit to Mr. Doubleday in 1860? If Mr. Cooper did not introduce them, has Mr. Meyrick any idea as to who did introduce them, and for what purpose? And does Mr. Meyrick suppose that if Mr. Cooper's captures had been determined and reported in, say 1858 or 1859, their authenticity would have been called in question?—H. G. Knaggs; 189, Camden Road, April, 1896.

Hybernation of the Larvæ of Colias hyale.—I have read with interest Mr. Williams's note (Entom. xxix. p. 128) respecting the hybernation of the larvæ of *Colias hyale*, as it so closely coincides with my remarks upon the larvæ of this species (Entom. xxv. p. 271; xxvi. p. 145) when I pointed out that the larvæ were capable of passing the winter in *complete* hybernation. The decisive manner in which my larvæ entered into hybernation, resting upon a layer of silk spun for the purpose, remaining in a hybernated condition for three months, and living for 121 days after entering into that state, is sufficient proof that this species is capable of hybernating in the larval state, which I fully believe to be its usual habit.—F. W. Frohawk; April, 1896.

Sugar *v.* Honeydew.—Prof. Clowes and Dr. Sudborough, of University College, Nottingham, have kindly promised to make a quantitative analysis of honeydew, if it can be procured in sufficient quantity, with the view of discovering whether some substance more attractive to moths than sugar or treacle can be produced artificially. Entomologists interested in the matter are asked therefore to collect leaves covered with honeydew and send them, before the middle of July, as freshly gathered as possible, to Prof. Clowes, University College, Nottingham. As large a quantity as possible should be sent, so as to give enough for an investigation.—F. C. Woodforde.

Notes on Various Insects.—*Encyrtus elpis*, Walk. This has been bred from *Lichtensia viburni*, the ivy Coccid, by my friend Mr. Richardson. —*Eupœcilia alismana*, Rag. This species used to stand in our lists as

E. udana, Gn.; but this name has lately been transferred to *E. notulana*, Zell. Why should not the old name *griseana*, Haw., be restored to the species renamed by M. Ragonot *alismana?*—*Catoptria asseclana*, Steph. This is clearly the northern form of *C. ulicetana*, Haw.—*Periplaneta australasiæ* and *P. americana*, &c. There appears to be a mistaken idea in the minds of some entomologists that these are recent additions to the British fauna. This is not so, for I have specimens of the former taken in a grocer's shop at Sherborne as long ago as 1839, but which have stood in my collection as representatives of the latter. *P. americana* and also *P. madeiræ* were recorded by Stephens in his 'Illustrations' as being frequently taken in London previous to 1835; and also *Blaberus giganteus* as occurring in the West India Docks. A smaller species, *Blatta germanicus*, he has also recorded as being an introduced species occurring in London and other towns.—*Chironomus nubilus*, M. This pretty species may be added to the British list, as I have taken it here; and Mr. Austen, on the banks of the Thames.—*Chironomus flexilis*, L. This pretty gnat I have taken on the banks of the Stour near Christchurch.—*Thrips vulgatissimus*, L. Has been very common this spring in the flowers of the daffodil. This belongs to the order Thysanoptera, of which there is an excellent monograph by Haliday in the third volume of the 'Entomological Magazine,' published in 1836.—C. W. Dale; Glanvilles Wootton, April 6th, 1896.

Mr. C. E. Fry's Collection.—This collection was sold on March 9th and 10th, and realised a total of £405 9*s.* 6*d.* It was richer in rarities than in varieties, but the former were in some cases considered of such doubtful origin as to cast a suspicion over genuine British examples; the condition was fair. Four specimens of *Pieris daplidice*, only fetched an average of 10/- each. Three of *Argynnis latona*, 5/- each. A nice lot of Argynnidæ, including a var. of *A. paphia* and a dark Scottish *A. aglaia*, went for 21/-. Five *Vanessa antiopa*, from various localities, made an average of 10/6 each. The series of *Chrysophanus dispar* were fine: eight males realised an average of £4 10*s.* each; six females produced £30 5*s.*, the lowest price being £2 10*s.*, and the highest £6 15*s.*, the latter being a bred specimen, and one of the finest I have ever seen anywhere. Three pairs of *Lycæna acis* made from 18/- to 20/-; and two males, 14/-. The hawk-moths went cheap, and, judging from prices, their authenticity was held not altogether proven. *Deilephila euphorbiæ*, from Wilkinson and Curzon's collections, averaged 5/6; and *D. lineata*, 7/3 each. *Chærocampa celerio*, 7/6 each. Three specimens of *Sesia allantiformis*, all said to be taken by Mr. Wilkinson near Bristol, 52/6, 52/6, and 27/6 each; and Mr. Hammond's Ashford specimen of *Sesia asiliformis*, 40/-. Six *Deiopeia pulchella* averaged 12/- each; whilst pairs of *Lælia cœnosa* sold at the rate of 21/6 a pair. Specimens of *Lasiocampa ilicifolia*, taken by Butler, Bristol, made from 16/- to 32/6 each. The original specimen of *Nyssia lapponaria*, which on March 20th, 1884, was sold at Stevens' for the large sum of £14, now only fetched 45/-. Two pairs of *Cleora viduaria* and a triplet made 30/-, 27/6, and 22/-; and a single *Boletobia fuliginaria*, taken at Victoria Docks by Mr. Herring, 25/-. Two specimens each of *Acidalia circellata* and

A. perochraria went for 32/6. The collection contained nine British (?) *Lythria purpuraria*, all taken by Button, Gravesend; no one believed in these, and they only realised 8/- the lot. A specimen of *Aplasta ononaria*, taken by Bailey, Folkestone, made 20/-. A series of *Abraxas grossulariata*, including two examples of var. *varleyata*, made 35/-. A nice black var. of *Larentia didymata* sent the lot it contained up to 26/-. Three lots of *Eupithecia*, each containing a couple of a supposed new species, with pairs of *E. jasioneata*, and other good pugs, made 20/-, 12/-, and 8/- a lot. Thirteen *Phibalapteryx polygrammata* and fourteen *Cidaria reticulata* averaged a little under 6/- a specimen. The Standish collection of Tortrices was also disposed of, but, with the exception of a pair of *Peronea cristana* var. *curtisana* which made 42/-, prices were poor all through. *Drepana sicula* were sold at about 10/- each. Three specimens of *Synia musculosa* fetched 14/-, 21/-, and 18/-; and five of *Leucania vitellina*, 13/-, 14/-, 20/-, 14/-, and 8/- each. *Nonagria sparganii*, from Mr. S. Webb, sold at an average of 25/6 per pair. Ten specimens of *Crymodes exulis*, sold in pairs, made from 18/- to 26/-. A specimen of *Hadena peregrina*, taken at Lewes by Miss Meek, ex Curzon's collection, 12/-. The collection contained seven *Hydrilla palustris*, all said to have been taken by Mr. A. Houghton; the lot realised only 51/-. *Dianthœcia barrettii*, in fine condition, sold at from 21/- to 35/- a pair; and a fine variety of *Polia nigrocincta* at 40/-. A specimen of *Hadena satura*, Newmarket Heath, was bought at 12/-. Two specimens of *Xylina zinckenii*, taken at Rannorth by W. Clare, produced 12/- each. A pair of *Plusia moneta*, with others, made 30/-; and a single specimen, 24/-. An example of *P. ni* realised 21/-. Two specimens of *Catocala fraxini*, 30/- and 21/-. Mr. Vine's first British specimen of *Catocala electa* produced 55/-; and two magnificent varieties of *Ophiodes lunaris*, 63/- and 40/-. Pairs of *Noctua subrosea* made 12/-, 10/-, 16/-, 28/-; and a fine bred pair, six guineas. A fine series of *Cidaria russata*, from Arran, containing one beautiful yellow form, made 65/-. The three cabinets realised as follows: 52 drawers, £14 3*s*. 6*d*.; a 12-drawer Standish, £7 15*s*.; and a 20-drawer ditto, £13 13*s*.—Thos. Wm. Hall; Stanhope, The Crescent, Croydon.

CAPTURES AND FIELD REPORTS.

Early appearance of Lycæna argiolus, Pararge egeria, and Smerinthus ocellatus.—Mr. G. C. Green, South Devon, reports in the 'Field':—"I have seen this morning, March 30th, in my garden, and watched for a long time, a lovely newly-emerged specimen of the azure-blue butterfly (*L. argiolus*). I have also seen this morning many fresh specimens of the speckled wood (*H. ægeria*)." I have to-day received, for identification, from Stratford-on-Avon, a living male specimen of *S. ocellatus*, the letter bearing date April 16th.—F. W. Frohawk.

Lepidoptera in Norway.—Can any of your readers tell me whether there are any Lepidoptera to be taken in the neighbourhood of Loen, Nordfjord, Norway, in August?—J. M. Hick; Trimdon Vicarage, Trimdon Grange, R.S.O., April 13th.

Captures at Sallows, 1896.—I have been working the sallows this season with more or less success. I was fortunate in finding *Oporina croceago* in perfect condition, and succeeded in taking eighteen specimens. The Tæniocampas were also fairly well represented; *T. cruda* was by far the most abundant, and I found one very light specimen with nearly black discoidal spots. *T. stabilis* was also abundant, and this as well as *T. instabilis* afforded some striking varieties. *T. munda* was by no means plentiful; I only came across some fourteen specimens, in one of which the "twin-spots" were of a light red colour. *T. gracilis* did not appear till about March 27th, but after that was very abundant, and I secured some beautiful specimens, a few being nearly 1¾ in. in expanse. *T. gothica*, of course, swarmed, but neither *T. miniosa* or *T. populeti* turned up, at which, however, I was not surprised, as I have never met with either in this neighbourhood. Perhaps the scarcest was *T. rubricosa;* I only took eight specimens, one of which was of a deep reddish brown, and having the discoidal spots very clearly defined and of a light yellow colour, presenting a striking contrast to the rich ground-colour. I also met with *Scopelosoma satellitia*, *Cerastis vaccinii*, *Anticlea badiata*, *Selenia illunaria*, *Xylocampa lithoriza*, *Hybernia progemmaria*, and one *Eupithecia exiguata*.—H. W. Shepheard-Walwyn.

Unusual Pairing of Lepidoptera.—On the night of March 24th I found on a sallow twig a male of *Tæniocampa stabilis* in cop. with a female *T. gothica*. I took them carefully home and fed them with sallow blossom. They remained in cop. for nearly a fortnight, at the end of which time the female seemed very feeble, and died after depositing three ova. Mr. F. G. Briggs, writing from Devonshire, tells me that he has just found a male *Hybernia progemmaria* in cop. with a female *T. cruda*.—H. W. Shepheard-Walwyn; Bidborough, Tunbridge Wells.

Plusia moneta in Surrey, 1895.—In August of last year I had the good fortune to capture a splendid specimen of *Plusia moneta* in a garden here. This moth was flying just after dusk round a tree loaded with ripe plums, which possibly had attracted it. Can you tell me any particulars as to the life-history or previous occurrence of this moth in England?—J. B. Morris; Malden House, Malden Road, Wallington, Surrey, March 23rd.

[*P. moneta* was first recorded as British in 1890, and it has been captured or bred each year since. The larva feeds on monkshood. *Vide* Entom. vols. xxiii—xxvii.—Ed.]

Endromis versicolor at Reading.—On April 6th, after several hours' close searching in this district, I had the pleasure of taking a very fine female of the above insect; I also found two small batches of ova.—W. E. Butler; Hayling House, Reading, April 10th, 1896.

SOCIETIES.

Entomological Society of London.—*April* 1*st*, 1896.—Professor Raphael Meldola, F.R.S., President, in the chair. Donations to the library were announced, and thanks voted to the respective donors. Mr. Luke Bishop, F.R.G.S., of 3, Tokenhouse Buildings, E.C., and Mr. Robert Nesham, of Utrecht House, Clapham Park, S.W., were elected Fellows of the Society. Mr. Champion exhibited, on behalf of Mr. Blatch, specimens of *Quedius riparius*, Kellner, captured in

February last on the banks of running streams at Porlock, Somerset. The insect was an interesting and unexpected addition to the British list, and the second recent novelty from the west country, the other being *Ochthebius lejolisi*, Muls. and Rey, found at Ilfracombe in June last by Mr. Bennett. It would seem to indicate that further additions to our list of Coleoptera might be expected from the country south of the Bristol Channel. He added that Mr. Waterhouse had informed him that he had seen specimens of the *Quedius* from Wales and Scotland. Mr. Champion also exhibited a small collection of Coleoptera made by Mr. O. V. Aplin in Southern Tunis during various expeditions inland from Gabes. The collection included some interesting Tenebrionidæ of the genera *Pimelia* and *Adesmia*. Mr. Aplin noticed specimens of these insects impaled by shrikes. Dr. Sharp, Mr. R. Trimen, and Mr. McLachlan made some remarks on the subject of the impalement of insects by birds. Mr. Goss exhibited, for Mr. Cameron, an apterous male of *Mutilla contracta* taken by Mr. Rothney in Barrackpore, India. The specimen was stated to be the first recorded instance in this species of a wingless male, and was also abnormal in having the thorax incised laterally. Dr. Sharp called attention to the fact that at a recent meeting of the Society (March 20th, 1895, see Proc., 1895, p. x) a specimen of a supposed dimorphic form of one of the species of *Dytiscus* was examined, and Prof. Stewart enquired whether any anatomical examination had been made of the sexual organs. He said that in the 'Comptes Rendus Soc. Bordeaux,' 1894, there was an account of the examination of the sexual organs of the supposed second form of *D. marginalis* by Mons. Peytoureau, who came to the conclusion that it was really a distinct species, which he called *D. herberti*. Prof. Poulton exhibited examples of the type labels now in use in the Hope Collection at Oxford, and illustrated their employment by projecting on the screen, by the lantern, a photograph of the Westwood types of African *Eusemiæ* described in Oates's 'Matabele Land' (Lond., 1881). He said that such labels, having been once set up in type, could be reproduced in electrotype very cheaply and efficiently. Black ink was considered better than red on account of its greater permanence. Mr. Verrall was of opinion that no species should be described from a single specimen or type, but from many specimens, and he wished every so-called "type" could be destroyed as soon as a species had been described from it. He knew of cases in which a "species" had been described from a single female specimen in bad condition. Mr. Blandford explained the system of labelling types in the Brussels Museum. Dr. Sharp, Prof. Meldola, Mr. McLachlan, and Prof. Poulton continued the discussion. Mr. Blandford exhibited a series of lantern slides showing the uses to which photography could be put in entomological illustration. The photographs shown included various *Saturniidæ*, *Vanessidæ*, species of *Mamestra*, *Tipula*, *Ophion*, *Carabus*, *Lucanus*, *Sitones*, &c., as well as one or two examples of insect-injury, and a view in Windsor Park showing oaks defoliated by *Tortrix viridana*. Mr. Blandford said that the photographs were taken without any considerable practice in photography; that good and well-set specimens were desirable for reproduction; the colour-values had to be arrived at by the careful use of orthochromatic methods, and a large lens of good focal length should be used. Careful attention had to be paid to the lighting of the objects, a point in which entomological experience was of great value. Prof. Poulton read a paper "On the Courtship of certain European Acridiidæ," from observations made in exceedingly favourable weather at the end of August and beginning of September, 1895. He was much indebted to Mr. F. Jenkinson, of Cambridge, and Mr. F. V. Dickens, for many independent observations and valuable confirmation. The observations were almost all made in the neighbourhood of the Weisshorn Hotel, high above Vissoye, in the Val d'Anniviers. Dr. Sharp had been kind enough to name the species referred to in the paper. Mr. G. F. Hampson read a paper entitled "On the Classification of Three Subfamilies of Moths of the Family Pyralidæ: the *Epipaschiinæ*, *Endotrichinæ*, and *Pyralinæ*."—H. Goss, *Hon. Sec.*

South London Entomological and Natural History Society.—*March 26th.*—R. South, Esq., F.E.S., President, in the chair. Mr. A. E. Eldridge, 50, Alpha Road, Surbiton, and Mr. F. A. Bowen, 11, Buckland Crescent, Hampstead, were elected members. Mr. F. Enoch gave a most interesting and instructive lecture, with lantern illustrations, entitled "The Life-history of the Tiger Beetle (*Cicindela campestris*)," being an epitome of his very numerous observations on this insect, both in nature and in confinement, during the last five years. Mr. Clark exhibited a number of photo-micrographic slides, many of which were prepared from specimens lent by members of the Society, and a fine specimen of the Röntgen ray photography. Many visitors were present.

April 9th.—The President in the chair. Mr. R. Adkin exhibited two specimens each of *Margarodes unionalis* and *Mecyna polygonalis*, which were taken at Deal in 1877 by the late Mr. Tugwell, and contributed notes on the occurrence of these and other species of Pyralides. Mr. Barrett, on behalf of Mr. Capper, of Liverpool, some 400 drawings, coloured by hand, of the remarkable varieties existing in his collection. Mr. Tunaley, a lantern for entomological purposes, invented by himself, to obviate the inconvenience and smell of oil. It was thought that it would be, when completed, a capital success. Mr. South, a banded specimen of *Vanessa urticæ* taken alive in his house at Tooting on March 22nd. Mr. Williams, a living specimen of *Bombylius media.* Mr. Turner, an apparatus sent to him for exhibition for taking moths from a lamp. It could be put on the end of a stick and worked by means of a string. Mr. McArthur, a bred series of *Hypsipetes trifasciata* from Hoy. They were of a rich chestnut colour, and had been reared from larvæ fed on heath; this was considered to be a most unusual food. Mr. Edward exhibited a number of examples of mimicry in Exotic Rhopalocera.—Hy. J. Turner, *Hon. Report Sec.*

Obituary.—With the deepest regret we have to announce the death of Mr. J. A. Cooper, of Leytonstone. The only particulars we have up to the time of going to press is that he died on April 18th from pneumonia supervening on influenza.

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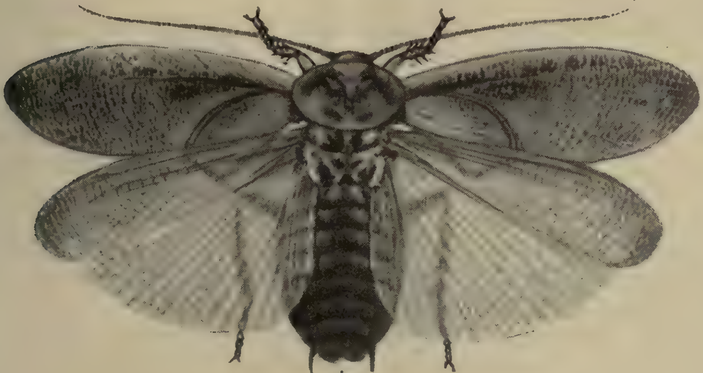
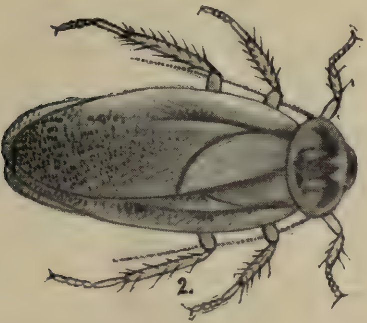
PANCHLORA MADEIRÆ, Fab.



1



2.

This handsome species, though not indigenous, has long been recorded as occurring in England. Of the two examples figured above, the one with expanded wings (fig. 1) was taken in Covent Garden Market on Nov. 8th, 1895, and exhibited alive at the South London Entomological Society on Nov. 14th, 1895, and during the meeting deposited an immature egg-capsule. The other, also from Covent Garden, was taken in 1894. Both are in my collection.

No doubt both were imported in cases of bananas.

The reproductions are natural size.

C. A. Briggs.

FUNGI PARASITIC ON BUTTERFLIES.*

By J. C. Rickard.

In the course of an examination of the wing-scales of *Pieris brassicæ,* I was surprised to notice the occurrence of large numbers of microscopic fungi among them; as this kind of parasitism was new to me, I looked through some thirty or forty volumes to see if I could find anything recorded about them, and being unable to find the slightest reference, I thought a few remarks concerning these organisms would be interesting to entomologists.

The scales of the upper surface of the wings of the male *Pieris brassicæ* are long and narrow, and have either a single notch or from two to four pectinations at the free extremity; the fungi bear a considerable resemblance to these in form and colour, and occur in such large numbers that in some instances they outnumber the scales as seen in the field of the microscope. The scales of the female butterfly do not resemble those of the male, as they are much shorter and broader in proportion. This sex, in this and the other species I have examined, is apparently free from the parasites, as also are the under sides of the wings in both sexes.

I am afraid I cannot describe these fungi in technical terms; but the diagram shows a rhizoid supporting the body or peridium, at the free end of which are two rounded lobes separated from each other and forming a kind of notch, from the middle of which rises a fine stalk bearing a mass of spores enclosed in a sort of bag, thus forming a sporangium.

The absence of the parasite from the female butterflies cannot be accidental, and presents a curious physiological problem. Nine females of this species were examined without finding any of the fungi; on the other hand, I examined nineteen males and found every one of them to be infected.

A somewhat similar fungus is found on the males of *Pieris rapæ*, but in reduced numbers; this is much shorter and broader than that of *P. brassicæ*, and appears to be wrinkled longitudinally, thus presenting an appearance almost like the striated surface of the scales. Of this species I examined and found fungi on four males, but could not detect them on any of the seven females that came under my notice.

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* Paper read before the Cambridge Entomological and Natural History Society, March 6th, 1896.

A fungus found on *Pieris napi* is apparently identical with that of *P. rapæ.* The butterfly from which my specimens were taken had been killed seven or eight years, and the fungi have probably become distorted in drying, and the sporangia have in most cases fallen from their stalks, and may be seen lying among the scales. I only examined one pair of this species; it was only the male on which fungi were found; and I may state here in reference to the other species that I am about to mention, that I have not yet discovered a fungus on any female individual.

A fungus of somewhat different form was found on a foreign specimen of *Pieris daplidice;* this is oblong in shape, the end bearing the rhizoid somewhat angular; there are no lobes as in the preceding examples.

Euchloë cardamines has a similar parasite, perhaps slightly narrower than that of *P. daplidice.* They occur in both the white and the orange portions of the wing.

The males of *Aporia cratægi* also have the same type of fungus parasitical upon them. They differ from the foregoing in that their sides are not parallel, thus causing them to taper somewhat towards the apex.

I have also examined three males and one female of *Leucophasia sinapis*, with the result that no fungi were found on any of them. This is the only species of British white butterfly on which the fungus is not present, and is also the only species in which the males possess more black scales than the females.

Several South African butterflies have similar parasites. Thus *Pieris severina* has one much like that of *E. cardamines*, except that the cyst is supported on a shorter stalk; while *Anthocharis achine* and *A. omphale* present modifications of form, and have their sporangia on rather long stalks, and also show signs of rupture at their apices. *Pieris agathina* (also a South African species) is the host of a very delicate and beautiful fungus. This is square in section, has no rhizoid like those previously mentioned, but is supported by four "ribs,"[*] one at each angle; the upper part of the body has a number of similar ribs,—all these ribs and the connecting membrane are reflexed or turned over at the top, which, while affording additional strength at the open end of the body, also forms a pretty border or coping to its walls; there is a central stem passing through the whole length of the fungus bearing a large sporangium, which, with the exception of a black spot at the apex, appears like a bubble of blown glass.[†]

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[*] These are probably "paraphyses" having a tendency to bend outwards, thus assisting in rupturing the top of the sporocarp, and converting the original circular shape into the square form of the mature organism.

[†] "Dr. Wollaston found the spores of *Reticularia maxima* to yield a

As this specimen of *agathina* has been dead some five- or six-and-twenty years, this glass-like cyst is probably formed of something different to ordinary vegetable substances.

Various species of Satyridæ are the hosts of a different form of fungus. In these the spores are not enclosed in a sporangium, but remain in the perithecium until mature, when they escape through a projecting tube* or spout; considerable numbers of spores may be seen on some of the slides, having fallen out since the specimens were mounted. Fungi of this character I have found on *Satyrus semele*, *Pararge egeria*, *P. megæra*, *Epinephele janira*, *E. tithonus*, *E. hyperanthes*, and *Cœnonympha pamphilus*; none were found on *C. davus* or *Melanargia galatea*; I have not examined *Erebia epiphron* or *E. medea*. The females of this family also seem to be free of the parasites. The fungus of *S. semele* has its sides parallel with each other, which, with its somewhat dark colour, gives it a robust appearance; the rhizoid forms a fringe the whole width of the base. The others are all much alike, and resemble in outline miniature carrots, or other similar tap-roots. They only differ in their relative proportions, and in being of lighter or darker colours. Thus the fungi of *E. janira* and *P. egeria* are long and slender, tapering gradually to the base; while that of *E. tithonus* is much broader above, and diminishes almost to a thread some distance from the rhizoid. The fungus of *E. hyperanthes*, as might be expected, is very dark, almost black (they only occur in small numbers); while little *C. pamphilus* has a correspondingly small fungus, which, however, is rather broad right down to the rhizoid, the latter being large in proportion to those found on the other species.

The parent forms of the fungi will probably be found—in a degraded state—on the food-plants of the various butterfly larvæ. We may easily believe that the spores would be distributed by the butterflies when hovering over the plants, and, after leading an epiphytal existence for a time, would be eaten by the caterpillars with the leaves on which they feed.

All the fungi hitherto noticed appear to belong to Berkeley's Gasteromycetes, a rather high order of the class. But certain species of *Lycæna* support a minute fungus, which, seen by transmitted light, appear like miniature tennis-rackets; viewed in this manner we get a false idea of their structure. They are conical or flattened pear-shaped bodies, with moderately long stems, no perithecium being present; the spores are external, and arranged in rows on the surface of a sporophore. The microscope I am using will not enable me to determine whether the spores are or are

phosphoric glass" (Berkeley, Crypt. Bot., page 339). Does the sporangium noticed above owe its transparency to this substance?

* These tubes are, I believe, the representatives of the "trichogyne" of some seaweeds (Florideæ, &c.).—J. C. R.

not contained in asci; but it is evident that this fungus belongs to an inferior group to those found on Pierids and Satyrids. I have found them on males of *Lycæna bellargus*, *L. corydon*, and *L. icarus*, all brightly-coloured species in comparison with *L. argiolus*, *L. minima*, and *L. astrarche*, from which they are apparently absent.

The relationship between parasite and host seems to be something more than ordinary parasitism. I have pointed out that, with the exception of *L. sinapis*, which has no parasite, the males of the British "whites" have fewer black scales than the females, the reverse being the case in regard to *L. sinapis;* so also with the "blues," the infested species are those that are considerably more brilliant than those not infested; the inference being that the fungus, by assimilating carbonaceous matters present in the excretory products of the butterfly that would otherwise be deposited in the wing-scales, tends to make the "whites" whiter, and the "blues" brighter than they would otherwise be. Fungi, unlike other plants, exhale carbonic acid, so a considerable amount of carbon must ultimately be eliminated from both the host and parasite. If this suggestion is correct, it is a case of symbiosis between butterfly and fungus; in any case, students of variations occurring in these groups will have to take into account that at least some part of the variation is due to the presence or absence of these parasites.

3, Halifax Road, Cambridge.

[We understand from Mr. Rickard that he has continued his investigations of these butterfly "fungi," with the result that his original conclusions are confirmed. He writes, "As a matter of fact, I am cultivating the spores between glass-slips; some have already germinated!"—Ed.]

NEW EXPERIMENTS ON THE SEASONAL DIMORPHISM OF LEPIDOPTERA.

By Dr. August Weismann.

(Translated from the German by W. E. Nicholson, F.E.S.)

(Continued from p. 157.)

VI. Experiments with Vanessa urticæ.

First experiment with urticæ, 1886. — Two nests of young larvæ, taken before the second moult (when 4 mm. long), were reared in the incubator at 27° C., 30° C., after July 2nd. The larvæ grew with astonishing rapidity, and pupated between July 3rd and 5th.

The pupæ remained in the incubator at 26–29·4° C., and there emerged—

On July 8th, 8 butterflies.
,, 9th, 20 ,,
,, 10th, 10 ,,
,, 11th, 8 ,,
—
Together 46

The pupal rest was therefore only 5–6 days.

These 46 butterflies are all brilliant red, without the dark shading of the ground colour, which is especially marked with the var. *polaris*, and arises from the black scales, which are scattered between the red ones. The black spots of the fore wing are tolerably large in six specimens, but in all the rest they are relatively small. Reckoning, with Von Reichenau,* the spots on the costa as 1, 2, and 3, those in cells 1, 2, and 3 as spots 4, 5, and 6; the spots 4, 5, and 6 especially are smaller than usual. On the basis of his excellent researches on the phylogenetic significance of the marking of *Vanessa*, Dixey † has recently proposed another enumeration of these spots; he designates the spots of the costa as I, II, III, and IV, and sees in them the vestiges of rows of spots running transversely across the wing, the units of which he designates by the Arabic numerals, beginning from the costa. Reichenau's spots 4, 5, and 6 are called by Dixey 8, 7, 6; his sixth coincides with the sixth of Reichenau. I shall adopt Dixey's enumeration on account of its phylogenetic foundation.

Second experiment with urticæ, 1886.—A large number of eggs and recently-emerged larvæ were found, on July 6th, on a mountain above the Giessbach, in canton Bern, 1200 ft. above the lake of Brienz, about 3000 ft. above the sea. These, when brought to Freiburg, grew rapidly in the incubator at 26–29·4° C., pupated between July 19th and 21st, and emerged between July 23rd and 26th; thus the whole metamorphosis from egg to butterfly was completed in 17–20 days.

The 36 butterflies exhibited nothing special; they were brilliantly coloured, as are all specimens of *V. urticæ* with us, and they had large black spots, for the most part somewhat larger than the specimens of the first experiment. One specimen has, however, the spots 5 and 6 smaller than any example of the first experiment. I cannot anywhere recognize constant and important differences from the specimens of the previous experiment.

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* Von Reichenau, "Die Züchtung des Nesselfalters," in 'Kosmos,' v. 12, p. 47, 1882.

† Frederick A. Dixey, "On the Phylogenetic Significance of the wing-markings in certain genera of the Nymphalidæ," in Trans. Ent. Soc. Lond. 1890.

Third experiment with urticæ.—As an opposite experiment to the preceding, a part of the larvæ of the second experiment were reared in a cellar at 15° C. Pupation first began on August 7th, and the butterflies emerged between August 27th and 29th.

The 10 specimens reared in this way are a little darker than those of the second experiment; the outer margin is somewhat blacker, and, before all, the spots are larger, especially spots 5 and 6, at least, in nine specimens. They are, however, still far from the var. *polaris*.

Fourth experiment with urticæ.—A nest of recently-hatched larvæ, found near Freiburg on Aug. 31st, was reared at a room temperature of 17–23° C.; after Sept. 16th it was only 17–20° C. Pupation took place between Sept. 25th and 28th.

The 22 butterflies reared are all rather bright, with small spots; in seven specimens *the spot 6 is quite small, and in one of them only a suggestion;* the outer margin is less dark than in the second and third experiments; and in no specimens are the spots so large as in these experiments.

The experiment, at all events, proves that the spots 7 and 6 can also turn out quite small at a medium temperature independently of heat. Hereditary predisposition therefore co-operates here also with individual differences, and consequently it cannot be said, in a particular case, how much is to be attributed to the one and how much to the other factor.

Fifth experiment with urticæ, 1888.—A nest of recently-hatched larvæ, found in the level country near Freiburg on Aug. 4th, was reared in the incubator at a temperature for the most part of 30° C.; fluctuations, however, occurred between a minimum of 25° C. and a maximum of 32·8° C. Pupation began as soon as Aug. 13th, and 8 butterflies emerged by the 18th, followed by 24 more on the 19th, 1 on the 20th, and 2 more on the 21st.

None of these 35 butterflies were especially dark; on the contrary, all were brilliantly red in the ground colour, and with relatively little black; the outer margin forms, towards the inside, a narrow regularly dentate black stripe, and the spots 6, 7, and 8 are of the usual medium size in only one specimen; in all the rest they are small up to the point of complete disappearance. Spot 6 is completely wanting in one specimen, while 7 is faint; in another 6 is faint, and 7 more distinct; these spots are unusually small with the majority. This marking closely approaches the Corsican variety *ichnusa*.

Results of the experiments with urticæ.—Experiments similar to those here described have been repeatedly carried out before. In 1880, by means of a somewhat diminished temperature, Dorfmeister obtained a powdering of the butterflies, transitions to the var. *polaris*. Two years later W. von Reichenau* repeated and enlarged these early experiments, when he, on the one hand, let the larvæ and pupæ develop at a high summer temperature under the influence of the direct rays of the sun, and, on the other, reared them in the autumn at 5–12° C. The former produced "beautiful fiery butterflies, which approached the var. *turcica*"; the latter produced "very dusky butterflies, noticeably brownish yellow with very large black spots." Dixey's spots 6 and 7 especially are considerably diminished in the heat form.

It is not evident from these experiments whether the temperature exercises its influence for alteration in the colouring at any determined time of the development, since the heat or cold —as, indeed, is advisable in early experiments—is acting during the whole development.

Dr. M. Standfuss, the experienced breeder of Lepidoptera, has, however, recently published experiments with *Vanessa urticæ*. He placed the pupæ for 60 hours in a temperature of 37° C., and noticed from this an approach to the var. *ichnusa* (or *turcica*) make its appearance, although this form was never quite reached. On the other hand, he placed pupæ in a refrigerator for 32 days, and thus reared in a room, after 9 or 10 days more, dark specimens with large black spots and much blue on the outer margin; likewise, therefore, an approach to the polar form of *urticæ*.

These experiments confirm the results of Von Reichenau in general, and at the same time they show, that the action of temperature falls wholly in the pupal period.

E. Fischer also repeated experiments of this kind with *V. urticæ*, and partly reared the var. *turcica* from pupæ, which had been subjected to "a tolerably high stove temperature (34–38° C.) for only a few days." ('Transmutation," &c. Berlin, 1895.)

The few experiments which I myself have conducted with *V. urticæ*, in general, indeed, confirm these results, but they do not make so clear and striking an impression as do those of Von Reichenau especially. In the latter's experiments all the specimens appear to have been altered each time in the same striking way. Unfortunately no details of them are given. It is possible that this is attributable to the very high temperature which Von Reichenau made use of—up to 45° C. in the sun.

But E. Fischer also, who employed a temperature up to 38° C., only reared the var. *turcica* "from a small portion of the pupæ," as I had done in my heat experiments, where 32·8 C. was the highest employed.

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* W. von Reichenau, "Die Züchtung des Nesselfalters (*Vanessa urticæ*, L.), ein Beweis für den directen Einfluss des Klimas," in 'Kosmos,' v. 12, 1882, p. 46.

This may partly explain why in the first experiment six specimens showed no diminution of the spots. The *one* specimen of the second experiment, which also had the spots 6 and 7 very small without the influence of a higher degree of temperature, and, further, the fourth experiment, in which seven specimens possessed quite small spots, without the employment of a higher degree of temperature, show, however, that hereditary individual differences also play a part in it.

On this ground we dare not trust, without something further, a result apparently so striking as that of the fifth experiment, although out of 35 butterflies, which developed under a high temperature, only one exhibited spots of the ordinary size, and the 34 others had them smaller up to the point of disappearance. Strictly speaking, the contrary experiment with cold, carried out with companions of the same brood, could first satisfy us as to how much is hereditary individual peculiarity and how much the result of the temperature. Unfortunately experiment has failed me just here. To be sure the third and fourth experiments form such a pair, but the results are not so sharp as might be wished. If, however, it is taken into consideration, that specimens of *V. urticæ* without spots 6 and 7, or with only faint indications of them, are only rarely seen with us in the open, the strikingly small size of these spots in 34 specimens of the fifth experiment may be considered as the effect of the high temperature. Further experiments are, however, required.

VII. EFFECT OF HEAT ON HYBERNATING LEPIDOPTEROUS PUPÆ, 1884.

In order to determine whether a high temperature acting for a longer time on pupæ, which are already undergoing their winter rest, can produce alterations in the colours of the perfect insect, pupæ of various butterflies and Sphingidæ were placed in an incubator with evaporating water on Jan. 10th, 1884, and there subjected to a temperature fluctuating between 27° and 30° C. There were the following species:—

(1)	*Vanessa levana*	120	specimens.
(2)	*Papilio podalirius*	4	,,
(3)	,, *machaon*	4	,,
(4)	,, *ajax*	1	,,
(5)	*Thaïs polyxena*	4	,,
(6)	*Doritis apollinus*	4	,,
(7)	*Thecla rubi*	2	,,
(8)	*Polyommatus amphidamas*	25	,,
(9)	*Lycæna argiolus*	4	,,
(10)	,, *iolas*	4	,,
(11)	*Nemeobius lucina*	4	,,

(12)	*Pieris rapæ*	12	specimens.
(13)	,, *brassicæ*	12	,,
(14)	*Sphinx ligustri*	2	,,
(15)	,, *pinastri*	3	,,
(16)	*Deilephila vespertilio*	2	,,
(17)	,, *galii*	2	,,
(18)	,, *euphorbiæ*	20	,,
(19)	,, *dahlii*	1	,,
(20)	*Smerinthus tiliæ*	4	,,
(21)	,, *quercus*	2	,,
(22)	,, *populi*	5	,,

Single specimens of all the species emerged: the date of the following was noted :—

On Jan. 12th, 1 *Doritis apollinus* (crippled).
,, 16th, 4 *Polyommatus amphidamas.*
,, 17th, 3 ,, ,,
,, 17th, 1 *Papilio podalirius.*
,, 18th, 2 ,, *machaon.*
,, 18th, 3 *Polyommatus amphidamas.*
,, 18th, 5 *Pieris rapæ* (crippled).
,, 18th, 5 *Vanessa levana* (one crippled).
,, 19th, 1 *Papilio podalirius.*
,, 19th, 6 *Vanessa levana.*
,, 19th, 3 *Polyommatus amphidamas.*
,, 19th, 1 *Pieris rapæ.*
,, 20th, 1 *Papilio ajax* var. *telamonides.*
,, 20th, 5 *Vanessa levana* (three crippled).
,, 20th, 1 *Pieris rapæ.*
,, 22nd, 1 *Sphinx pinastri.*
,, 22nd, 1 *Vanessa levana.*
,, 22nd, 2 *Polyommatus amphidamas.*
,, 23rd, 1 *Sphinx pinastri.*
,, 23rd, 1 *Polyommatus amphidamas.*
,, 23rd, 1 *Vanessa levana.*
,, 24th, 1 *Sphinx vespertilio.*
,, 24th, 1 *Deilephila dahlii.*
,, 24th, 1 *Vanessa levana* (crippled).
,, 28th, 1 *Papilio podalirius*
,, 28th, 1 *Deilephila euphorbiæ.*
,, 29th, 1 ,, ,,
,, 30th, 2 ,, ,,
,, 31st, 3 ,, ,,
On Feb. 1st, 2 ,, ,,
,, 4th, 2 ,, ,,
,, 6th, 1 ,, ,,
,, 8th, 1 ,, ,,
,, 11th, 1 ,, ,,

On Feb. 12th, 1 *Deilephila euphorbiæ.*
,, 15th, 3 ,, ,,
,, 17th, 1 *Sphinx pinastri.*
,, 20th, 1 *Deilephila euphorbiæ.*
,, 21st, 1 ,, ,,
,, 25th, 10 *Vanessa levana* (nine crippled).
,, 26th, 1 ,, ,, (crippled).
,, 28th, 1 *Sphinx pinastri* (crippled).

I could not *detect any departure from the normal marking or colouring* in any of the species which emerged in the incubator. The influence of a temperature of 27–31° C. was *nil* on pupæ already several weeks old in relation to the form of the perfect insect. On the other hand, the development was considerably hastened with all, but, as is general in forcing pupæ, in a very irregular manner.

VIII. General Part: Recapitulation.

Although I am far from considering the few experiments, which I could here put forward, as sufficient for reaching a decisive settlement of our opinions on seasonal dimorphism, yet I cannot forbear arranging them, provisionally at least, in reference to our general conceptions of the subject. When in the year 1875 I first set about investigating the ways of this striking and yet so long neglected phenomenon, I assumed that it was to a certain extent obvious, that this kind of dimorphism was everywhere a direct result of the various direct influences of climate, principally of the temperature, as it affects in regular alternation the spring and the summer brood of many-brooded species. I had also well considered the other possibility, that dimorphism connected with the time of the year might also depend upon the *indirect* influence of the changing environment, *i.e.* that it might depend upon *adaptation* to the varying environment of the butterfly according to the time of year. I then said: "It is not inconceivable in itself, that phenomena occur among the Lepidoptera analogous to the winter and summer clothing of alpine and arctic mammalia and birds, only with the difference, that the change in colouring does not arise in one and the same generation, but alternately in different ones." But at that time the fact that the *upper side* of butterflies, which is usually not adaptive, can be very variable just in summer and spring, sometimes more so than the adaptive under side, appeared to me to contradict this adaptation of seasonal dimorphism. Yet it was the fact that the one or the other seasonal form could be produced artificially by the operation of a higher or a lower temperature, *i.e.* the stamp of the winter form might be impressed on the summer brood and *vice versâ*. I therefore concluded that it was the measure of heat, which was acting during the pupal period, which directly formed the species in one way or the other, and I felt the more justified in so doing, as the climatic varieties form a parallel to the seasonal forms, and as the former must without doubt be referred to the direct influence of climate, especially of temperature.

Thus, for example, *Chrysophanus phlœas* is seasonally dimorphic in Sardinia and at Naples; the summer form, which develops during the summer heat, is very dark, almost black, but the spring form corresponds with our German red-golden *phlœas*.

Although to-day I still look upon this view as correct, and a directly altering effect of temperature as proved, yet I have gradually been convinced, that this is not the sole origin of seasonally dimorphic variability, but that there is also *adaptive seasonal dimorphism*. We must, I believe, distinguish *direct* and *adaptive* seasonal dimorphism; and I see in this distinction an important advance, which before all places us in a position to explain the results of the various experiments undertaken by myself and others in a much more satisfactory manner.

I have already pronounced this view in a lecture* delivered at Oxford in the beginning of 1894, and I have sought to show that adaptive seasonal dimorphism, which I had previously only put forward as possible, does *actually* occur. The example there given for perfect insects was, indeed, only a hypothetical one, *viz.* the case of *Vanessa prorsa-levana;* but for larvæ, at least, I can select an example from Edwards's excellent work on the North American butterflies with tolerable certainty, *viz.* that of *Lycæna pseudargiolus*, which will be more accurately discussed later on. I did not then know, what I learnt shortly afterwards from an interesting little pamphlet of Dr. G. Brandes, that cases of seasonal dimorphism had been known for a long time among *tropical* butterflies, and that among these, at least, one of the seasonal forms depends upon the assumption of a special protective colouring. Brandes maintains, with justice, that the view hitherto widely held among us is erroneous, according to which seasonal dimorphism was not to be expected in tropical countries, since the alternation of seasons is absent there. Periods of rain and drought, at least for many tropical countries, form such an alternation very sharply. At any rate, Doherty and, somewhat later, de Nicéville, have pointed out, for Indian butterflies, a series of seasonally dimorphic species, not merely by observation of the alternation of the two forms in nature, but by rearing the one form from the eggs of the other; thus among Satyrids of the genera *Yphthima*, *Mycalesis*, and *Melanitis*, and for the species of *Junonia*, it is accepted as proved; and in all these cases the difference between the two forms principally consists in the fact that the one form seems like a dry leaf on the under side, while the other possesses another marking, and at the same time a number of ocelli.

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* 'Aeussere Einflüsse als Entwicklungsreize,' Jena, 1894.

Without engaging in the controversy as to the biological value of these ocelli, I do not for a moment doubt but that the colouring with ocelli is also an adaptive one, possibly protective or intimidating colouring. If one of the two forms had no biological adaptive significance, it could no longer exist; the single adaptive one would have replaced it. But it is obvious that the appearance of complicated details of marking and colour, such as ocelli are, cannot be simply the direct effect of heat or cold, drought or humidity. *These influences are not the actual causes of such formations, but only the stimulus, which sets their primary constituents free*, i.e. induces their development, as I tried to demonstrate in the lecture above noted. As the sufficient cause of the winter sleep of the marmots does not lie in the cold, but in the organization of the animal which is adapted to the cold, and as the cold only brings the existing predisposition to winter sleep into play, so among these butterflies with adaptive seasonal dimorphism the display of the one or the other marking is apparently connected, partially at least, with one of the above named outward influences, although in reference to these tropical butterflies we do not yet know to which of them.

We recognize *temperature as the stimulus to development* with the cases of adaptive seasonal dimorphism of our indigenous butterflies, as in all cases of seasonal dimorphism, which have been hitherto proved experimentally, it is always high and low temperature, which gives the outward impulse to the appearance of the one or the other form, where this impulse did not come exclusively from *within*.

There are therefore two different sources of the appearance of seasonal dimorphism; on the one hand, the *direct action* of alternating external influences, *viz.* temperature, can bring about this change in the outward appearance; and, on the other hand, the processes of selection. It is therefore necessary to consider these two kinds of seasonal dimorphism separately. It will certainly not always be easy to decide between them when a particular case has to be dealt with, as at present it is not always possible to say whether a colouring or marking has a definite biological value or not. Both causes also may co-operate in one species.

Direct seasonal dimorphism.—Among our indigenous species *Chrysophanus phlœas* may be certainly considered an example of this. In the first place, the seasonal differences relate only to the upper side, and then a biological value can scarcely be discovered for the black powdering of the summer form, *eleus*. Moreover, it occurs in both sexes.

On this point the experiments of Merrifield and my own are in complete agreement as to the fact that the influence of a higher temperature on the pupæ makes our German butterflies, which are alike in both broods, somewhat darker; but my experiments with a Neapolitan brood have proved that this brood becomes red-gold through cold, and powdered with black through heat, but that the latter character appears at a much lesser temperature, and far more strongly than in the German brood. One cannot, therefore, forbear ascribing a somewhat greater sensitiveness for this colour reaction from temperature to the southern colony of *phlœas*, than to the northern, particularly since a long subjection to a low temperature nevertheless permits the Neapolitan brood to appear with more black on the margins of the wings, than the German form ever possesses. Theoretically, therefore, this statement of the fact can be expressed on the ground of my theory of heredity somewhat in the following manner: the determinants (Bestimmungsstücke) assumed in the germ-plasm of the scales concerned have been a little altered in southern colonies of the species in the course of generations by the constantly recurring high temperature, so that they tend to the formation of black scales in a stronger degree than with the northern colonies of the species. But among the latter also these determinants can be induced to form black scales, if they are affected by a high temperature at the time during which the formation of colour is going on in the wings, *i.e.* in the last days of the pupal rest. The alterations of the scale-determinants are consequently *twofold* in this case; *on the one hand* the climatic temperature acts upon them so long as they, still enclosed in the germ-plasm of the egg or the sperm, are contained in the reproductive organs of the insect, and this operation of altering must first be a minimal one, which only increases to a noticeable extent by accumulation during a long course of generations; were it not so, the spring brood from Naples could not still be always comparatively free from black powdering, as is the case. But secondly, the temperature effects alterations in the scale-determinants in question, when they are already enclosed in the rudiments of the wings of the pupa, and are on the point of forming the scales of the wing, and this effect is a very much stronger one. But while the former must be transmitted from one generation to another by the continuity of the germ-plasm, and can therefore also gradually accumulate and increase, the latter cannot be inherited, as the wings and wing-scales of a particular individual die with it, and this accounts for the pure golden colour of the spring form of the south.

I might lay especial stress on Merrifield's observation, according to which the last five or six days of the pupal period are the *critical* ones, *i.e.* for deciding on the colour which should arise.

Two of Merrifield's experiments (Nos. V. and VI.) appear to me to prove this. Pupæ, which had been kept for ten weeks at 4° C.,* were half of them then brought into a temperature of 13° C., in which they emerged after 34–36 days as the pure golden spring form; the other half of the iced pupæ were brought into a high temperature (32° C.), where they emerged in 5–6 days, and, indeed, as black powdered forms approaching the form *eleus*. The latter experiment, to be sure, was only made with five or six specimens, and in the first about half the pupæ died, or emerged crippled; but yet the result is so definite, that it may well be regarded as conclusive. Nevertheless, I should have liked to have repeated it once more with a larger number of individuals, if I could have obtained material for it. The question of the *critical period* for the influence of temperature appears to me the more important, since with other species I have found just the opposite, *viz.* that *the beginning* of the pupal period determines the form of the dimorphic butterfly, and since it appears to me possible, on theoretic grounds, that this may be different in *direct* and in *adaptive* seasonal dimorphism.

It is conceivable, on *direct* alteration of climate, that the effective temperature must set to work, when the colours of the wings are beginning to form, as how should their alteration be otherwise brought about, if not by changes of the chemical processes, which underlie the production of colour? The determinants of the scales will therefore be influenced in this way at the moment, in which they become active; they undergo various small modifications by different temperatures, which lead to an alteration in the course of the colour-chemistry. But whether with many species, which appear to be altered directly by the climate, quite other factors do not co-operate to influence the colour-chemistry, is another question, whose solution is certainly not possible at the present time. I might, indeed, consider it probable from the result of Experiment VIII., in which hybernating pupæ of a large number of the most various species of Lepidoptera were kept at 30° C., and thus induced to emerge earlier. None of them exhibit anything special in marking or colouring, although here certainly an increased temperature was operating just at the time when the formation of colour is going on. This points to the fact, that with the various considerable alterations, which Dorfmeister, Merrifield, Standfuss, E. Fischer, and many others have produced by cold or a higher temperature in many butterflies, it is not the chemical processes on the formation of colour itself, but rather the various predispositions to the colour-patterns of their ancestors still contained in the germ-plasm, or later on in the rudiments of the wings of the species in question, which might be stirred to activity in different ways, just as also Dr. Dixey has interpreted—certainly with justice—many of Merrifield's cold and heat aberrations as partial reversion to ancestral characters. With *Vanessa io*, at least, a quite striking agreement in the marking of the fore wings with *Vanessa urticæ* and its nearest allies is brought about by the action of cold, which does not admit of another explanation. Standfuss and E. Fischer also reared an exactly similar aberration by the continued action of ice upon the pupæ, and they also interpret it as reversion in the direction of *Vanessa urticæ*.* Moreover, it seems to me important, that all these experimentalists had to first subject the pupæ, after the long cooling (on ice 8–42 days), to a higher temperature for a longer time before they emerged. With Merrifield it still required 18 days of a temperature of 16° C., with Standfuss 9–10 days at "the room temperature." *The chemical processes, therefore, of the formation of colour did not go on here under the influence of cold*, but of medium heat—another sign, that it is here a question of the indirect effect of cold.

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* A reference to Merrifield's paper shows that this should be 0·1° C. (Translator).

Thus it is also in all probability in the *second kind of seasonal dimorphism—the adaptive*. Two different patterns will be present here close to one another as rudiments in the germ-plasm, and the question as to which of the two kinds shall become active is decided in the period immediately after pupation, not later. It can scarcely be otherwise, as with this kind of seasonal dimorphism not merely the quality of the colour is concerned, but also the whole pattern,—in many cases, indeed, even the form of the wing (in a slight degree with *Pieris napi*, in a much stronger degree, according to Edwards's sketches and figures, with the American *Grapta interrogationis* var. *fabricii* and var. *umbrosa*). All the processes of the growth of the wing must, therefore, be altered by it, and it is evident that this can no longer happen, if the form of the wing already exists in a complete state.

However, before I pass on to the closer discussion of adaptive seasonal dimorphism, I might cast a glance at the results on *Vanessa urticæ*. This species, indeed, is nowhere seasonally dimorphic, but is certainly climatically polymorphic, *i.e.* it has a dark polar form, var. *polaris*; a bright red southern form, var. *ichnusa*, with very small black spots, sometimes entirely absent; and an intermediate form which belongs to Central Europe. These differences also seem to depend on the direct action of the different temperature which affects the pupæ. The existing experiments, indeed, are still very incomplete; above all, experiments entirely with the Sardinian *ichnusa* and *polaris* form are still required; but we have still succeeded in several cases in more or less completely producing the *ichnusa* form by heat and the *polaris* form by cold from our intermediate German form.

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* M. Standfuss, 'Ueber die Gründe der Variation und Aberration des Falterstadiums bei den Schmetterlingen,' Leipzig, 1894. Sonderabzug aus Insectenbörse. E. Fischer, cand. med., 'Transmutation der Schmetterlinge in Folge Temperaturveränderungen,' Berlin, 1895.

The darker colouring of the polar form scarcely depends on adaptation, or is Lord Walsingham's interpretation correct, according to which the duskier colouring of the arctic butterflies is considered as a protection from temperature? In this case we must expect that the dark colouring of this var. *polaris* still remains constant at a high temperature, as the scale-determinants in question would then be directed once for all to the production of black. Before experiments have disproved such a state of affairs, I might regard the change in the darkness of *Vanessa urticæ* as the direct result, biologically without significance, of the action of different degrees of temperature on the wings in the course of development. But heat-experiments with the arctic brood would be quite as desirable as cold-experiments with the Sardinian.

Thus we have before us, in *Chrysophanus phlœas* and *Vanessa urticæ*, species which, according to the present position of our view, exhibit *direct* seasonal or climatic dimorphism; and it is interesting, that—as I brought forward years ago—the direct action of a higher temperature has just the opposite result in the one species to what it has in the other: *phlœas* is blackened by heat, *urticæ* becomes brighter and more fiery from the same cause. We cannot, therefore, say generally how often and how repeatedly this has happened: that heat darkens the colours of butterflies.

(To be continued.)

REMARKS ON "ADDITIONS TO THE BRITISH LEPIDOPTERA DURING THE PAST TEN YEARS."

By Eustace R. Bankes, M.A., F.E.S.

As the list of "Additions to the British Lepidoptera during the past Ten Years," published in the 'Entomologist,' xxvii. 342–5 (1894), was to some extent compiled from notes and information supplied to Mr. South by myself, I may perhaps be allowed to supply a few omissions that I notice, and corrections, &c., that should be made. Species formerly omitted are marked thus *.

Sesia conopiformis, Esp., must apparently be struck out. Although Mr. C. W. Dale has not yet cancelled his note in Entom. xxvii. 245, I learn that it was decided at the meeting of the Ent. Soc. London, at which he exhibited the specimen recorded as *conopiformis*, that it was not that species, though its identity was not definitely ascertained.

Caradrina superstes, Tr. Most of Mr. Tutt's determinations in Brit. Noct. Vars. i. 148–9, having been cancelled, it is advisable to substitute the reference "Ent. Rec. vi. 203–4," where *superstes* is established as British.

*Thalpochares paula, Hb.,—with the references "E. M. M. x. 19; Ent. Ann., 1874, p. 156,"—should be inserted after *Plusia moneta*. Mr. South altogether omits this species from the Ent. Syn. List,† and also from the "Additions," though I sent up its name for insertion.

Hercyna phrygialis, Hb., should not be admitted to the British list on the evidence offered in E. M. M. xxviii. 264.

Melissoblaptes gularis, Zell. I failed to persuade Mr. South to omit this insect, though he acknowledged my protest by inserting a "?" before it. He entered it on the strength of Mr. J. H. A. Jenner's note in Entom. xxv. 286, but it is there clearly stated that the moths emerged at Lewes from larvæ or pupæ imported direct from Japan to London, and they were therefore not of British origin. No evidence of the species having established itself in this country has yet been produced.

*Antithesia carbonana, Brt., with the reference "E. M. M. xxiii. 4," should be inserted after *Tortrix decretana*. The name *carbonana* was used by Doubleday in his List, but he sunk it in his Sppl. List as a synonym of *fuligana*, and it is uncertain to what insect he applied it; in any case Doubleday's name cannot stand, because it is unsupported by any figure or description. Mr. Barrett, however (E. M. M., *l. c.*), uses the name for the fen insect, attached to *Stachys palustris*, which he there separates from *fuligana* and describes as *n. sp.*

Retinia retiferana, "Hein." For "Hein" read "Wk." Mr. Barrett inaccurately attributes the name to Heinemann in E. M. M. xxix. 113. Wocke pointed out that *margarotana*, Hein., was not identical with *margarotana*, H.-S., and gave the name *retiferana* to the former species.

Gelechia semidecandrella, "Threlfall." For "Threlfall" read "Stn. & Thrfl." In E. M. M. xxiii. 233, Threlfall names the species, but, instead of describing it himself, quotes with due acknowledgment a MS. description drawn up by Stainton. It is, therefore, a case of joint authorship.

Lita ocellatella, "Sta." For "Sta.; Ent. Ann. 1859" read "Boyd, Ent. Week. Intell. iv. 143 (1858)." Since the Entom. "Additions" were published, coloured figures of imago, larva, and tenanted portion of food-plant of this species, as well as of its allies *L. suædella* and *L. plantaginella*, have appeared in Proc. Dors. N. H. & A. F. C. xv. pl. *adv.* p. 59.

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† Included in "Addenda et Corrigenda."—R. S.

ACROLEPIA ASSECTELLA, Zell. As the history of the specimen recorded in E. M. M. xxx. 291 is unknown, there is not sufficient evidence for admitting this species into the British list. This latter remark applies also to *Xystophora servella*, which I purposely omitted, although one example was bred in a London suburban greenhouse (E. M. M. xxv. 361), and two moths taken near King's Lynn may perhaps represent that species (E. M. M. xxx. 51).

ORNIX FAGIVORA, "Sta." For "Sta." read "Frey."

COLEOPHORA FLAVAGINELLA, Zell. Add reference to coloured figures of imago and larval case in Proc. Dors. N. H. & A. F. C. x. pl. *adv.* p. 197, figs. 5, 5a.

*COLEOPHORA ARTEMISIELLA, Scott, Ent. Ann. 1861, p. 89; Trans. Ent. Soc. Lond., N.S., v. 409–10, pl. xvii., figs. 2 m, 2 a, should be inserted. This species—so distinct from *C. artemisicolella* and *C. maritimella*, with which it is sometimes confounded—was omitted by Mr. South from the Ent. Syn. List, and also from the "Additions," though I sent up the name and reference for insertion.

LITHOCOLLETIS ANDERIDÆ, Flchr. Add reference to coloured figure of imago in Proc. Dors. N. H. & A. F. C. xi. pl. *adv.* p. 47, fig. 8.

LITHOCOLLETIS DISTENTELLA, "Frey." For "Frey," read "Zell."

NEPTICULA AUROMARGINELLA, Rdsn. Add reference to coloured figure of imago in Proc. Dors. N. H. & A. F. C. xi. pl. *adv.* p. 47, fig. 10.

NEPTICULA FILIPENDULÆ, Wk. Omit the "?" inserted before the name in Entom. "Additions." I now learn from Mr. W. H. B. Fletcher that he entered the "?" in his List (Trans. Chich. & W. Sussex N. H. Soc., No. 5) not from any doubt about the identity of his insect with *filipendulæ*, Wk., but in hesitation whether *filipendulæ* was truly distinct from *poterii*, Stn. In any case *filipendulæ* stands secure at present.

NEPTICULA GEI, Wk. For "*gei*, Wk." read "*fragariella*, Heyd." Dr. Wocke described *gei* as *n. sp.* in 1871 in the well-known Catalogue which he compiled with Dr. Staudinger, but himself afterwards sunk it as identical with *fragariella*, Heyd., in the concluding part of the 'Schmet. Deutsch. und der Schweiz,' which he brought out in 1877 after the death of Von Heinemann.

In the list of "Additions, &c.," *Catocala electa*, *Lita ocellatella*, and *Nepticula rubivora* should have each been marked with an asterisk as having been omitted from the Ent. Syn. List (1884).

The Rectory, Corfe Castle: February, 1896.

P.S.—ARGYRESTHIA ILLUMINATELLA, Zell., which was inserted in the "Additions" (*l.c.* p. 344) on the strength of the note in E. M. M. xxx. 51, must now disappear from the British List (*vide* E. M. M. xxxii. 98).—E. R. B., May 4th, 1896.

ON THE IDENTIFICATION OF *DANAUS PLEXIPPUS*, LINN.

By W. F. Kirby, F.L.S., F.E.S., &c.

Considerable confusion has arisen, and still prevails, respecting the butterfly which ought to retain this name; and it may, therefore, be useful to set forth the full evidence.

The original description (Syst. Nat., ed. x., i. p. 471, n. 80), with the references, &c., is as follows:—

"P. D. alis integerrimis fulvis; venis nigris dilatatis, margine nigro punctis albis.
Pet. Mus. 58, n. 527.
Sloan. Jam. 2, p. 214, t. 239, f. 5, 6.
Catesb. Car. 2, t. 88.
Rai. Ins. 138, n. 3.
Habitat in America septentrionali.
Alæ primores fascia alba, ut in sequente, cui similis."

The species alluded to in the last line is *Danaus chrysippus*, which has a white subapical band on the fore wings, a character not exhibited by any American species.

It is to be noted that Linné does not add the letters "M. L. V." to either species, leaving it to be inferred that they were not in the Queen's Collection at the time.

In 1764 Linné published his descriptive Catalogue of the Queen's Collection (Mus. Ludov., Ulric. Reginæ, &c.); and at p. 262 describes *Papilio plexippus*, quoting Sloane, Catesby (*with doubt*), and Petiver. The most important passages here are the following:—

"Habitat in America septentrionali. P. Kalm, Meus e China."

"Alæ Primores apicibus late nigris in qua parte, præter puncta alba, etiam Fascia alba interrupta ex Maculis quinque."

This would lead us to infer that Linné's type was a Chinese specimen, which alone could be fairly compared with *D. chrysippus*, and to which alone the sentence beginning "Alæ Primores" could apply.

This is the view taken by Dr. Aurivillius in his "Recensio Critica Mus. Lud. Ulr." p. 70, published in the Swedish 'Vetenskaps Handlingar,' ser. 2, vol. xix., no. 5. He adds the further evidence that two specimens of the Asiatic insect still exist in the remnants of the Queen's collection, and that it is figured under the name *plexippus* in an unpublished plate by Clerck.

The notice of *P. plexippus* in Linné, Syst. Nat. (ed. xii.), i. (2), p. 767, n. 117 (1767), only differs from that in the 10th by the addition of the words "Mus. Lud. Ulr. 262," and by the reference to Ray being placed first.

What is the evidence in favour of the name *plexippus* being applicable to a North American species?

Firstly, Aurivillius quotes a very old description of the North American insect, which Linné received from Kalm, from an old MS., with a reference to Catesby. But there is no evidence that the name *plexippus* was affixed to it; and Linné's own words seem to imply that he considered his Chinese specimen the type, especially keeping in view the line appended to the original description comparing the butterfly to *chrysippus*. But can we set aside the American locality, and the reference to books in which American species are described or figured? And what is the species mentioned in these old books which Linné quotes?

Some of Linné's references are wrong, to begin with. To take Petiver first: we find, in Petiver's 'Museum,' p. 52, n. 527, a butterfly from Carolina briefly described, which he figured afterwards in his 'Gazophyllacium,' pl. 15, fig. 9. If we admit the claims of American butterflies, this should be the typical figure; but it represents *Limenitis archippus*, Cramer! Sloane, of course, figures *Anosia jamaicensis*, Bates; and it is not till we come to the third quotation (Catesby), which Linné afterwards quoted with doubt, that we meet with the common North American *Anosia menippe*, Hübner. Lastly, Ray's description belongs rather to *A. jamaicensis* (which he actually called the butterfly), than to any other species; though he also quotes Petiver's notice of a butterfly from Carolina, which, as we have seen, was *Limenitis archippus*.

Under these circumstances, I am still of opinion that it is better to regard the eastern *Danaus*, figured by Cramer as *Papilio genutia*, as the true *Papilio plexippus*, of Linné, on the strength of his comparing it with *D. chrysippus;* and having regard to Clerck's figure, and the ostensible types; and to call the common American species, now becoming naturalised among us, by the name of *Anosia menippe*, Hübner.

DAMP COLLECTING-BOXES AND LAUREL-JARS SUPERSEDED.

By H. Guard Knaggs, M.D., F.L.S.

In your issue for October, 1894 (Entom. xxvii. 294), Mr. Philip de la Garde drew attention to the use of naphthalin as a means of keeping freshly-caught insects relaxed without damp, even when collecting under a tropical sun. This statement was referred to (E.M.M. xxxi. 21) in January, 1895, in a foot-note to my description of Mr. Clark's rapid and wonderful method of relaxing dried specimens by the application of wood-naphtha to their thoraces. It has been a matter of surprise to me that none of your readers would seem to have spotted the paragraph in question. To me it appears to be one of the most interesting discoveries that has been brought before the entomological public for many a year; for it had long been my hope that some vapour might be found to take the place of aqueous moisture, of which I confess to having a horror, even when its evil effects are, to a certain extent, mitigated by the addition of carbolic acid. It is, therefore, with great satisfaction that I am enabled, from my own experience, to confirm Mr. de la Garde's observations in every respect.

In a well-closed vessel containing a fair amount of naphthalin, insects will undoubtedly keep supple for a long time; a cockroach killed in a cyanide-bottle, to which four crushed marbles of albo-carbon had been added, displayed no indication of *rigor mortis*, and a month afterwards was as pliant as when first killed—even more so; and yet there were not the slightest signs of putrefaction, disarticulation, or mildew. A *Biston hirtaria*, literally soused with a drachm of chloroform, in which it was allowed to remain for two hours, and then put into a well-stoppered bottle with a quarter of an ounce of sublimed naphthalin, was, in a fortnight afterwards, in perfect condition for setting out. It would seem, therefore, that, in addition to its power to keep freshly-caught insects relaxed, naphthalin has the effect of counteracting the rigidity caused by cyanide, and even of an over-dose of chloroform; and no doubt, if it were combined (either mixed or in a separate compartment) with cyanide in our killing-bottles, the latter would be considerably improved thereby.

Combined with a few drops of wood-naphtha, as in my suggestion for "Dry-relaxing" (E. M. M. xxxii. 101), it will be found very useful for relaxing small Micros, which will not bear the application of wood-naphtha, or indeed of any other fluid.

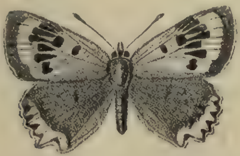
Fortunately the relaxing action of naphthalin, alone, upon *dried* specimens is quite insufficient to prevent the continuation of its use as a valuable prophylactic against mites and mould in our cabinets.

Let me persuade your readers to give naphthalin a trial, for I am morally certain that it will henceforth take the place of the damp collecting-box and the laurel-jar.

Mr. de la Garde has conferred a great boon upon entomologists by his discovery, and it seems to me quite safe to predict that naphthalin, like many other gas products, has a grand future before it.

London: May, 1896.

CHRYSOPHANUS PHLŒAS, Ab.



The specimen of *C. phlœas* figured above is from the collection of the late Mr. J. A. Cooper, of Leytonstone; it was captured a few years ago on Wanstead Flats.

In October, 1893, the memorable *phlœas* year, Mr. Sabine sent me for figuring some aberrations of the species which he had recently taken; two of these are represented on p. 305, vol. xxvi. of the 'Entomologist.' Upon reference to these figures it will be seen that fig. 1 bears a remarkable similarity in the character of the aberrant markings to the figure now given; but in Mr. Sabine's specimen the variation is confined principally to the under surface, while in the present specimen the variation only appears on the upper surface, the under surface being completely normal. The upper surface of the primaries only are adorned with bold black club-like markings, adding greatly to the beauty of the insect.

A somewhat parallel aberration of this species is also figured, Entom. xi. p. 25, in which the usual markings are greatly exaggerated, forming a broad black band across the primaries. In the description given of the specimen it is stated that "the lower wings are marked as usual, and the markings of the under side are entirely normal"; thus agreeing exactly with the specimen now figured.

F. W. Frohawk.

NOTES AND OBSERVATIONS.

Pairing of Hybernia rupicapraria.—Though I cannot answer Mr. Thornewill's question *re* the above (*ante*, p. 130) with absolute certainty, I think it most probable that pairing takes place in the early morning. I happened to be out at 4 a.m. on Jan. 30th last, and the males were then busy on the wing, and continued so for at least two hours, as I again saw them on my return home at 6 a.m. I had no time then to search for the female, which I afterwards regretted, as it would have cleared up any doubt on the point. — N. F. Searancke; Mitcheldean, Gloucestershire, April 20th, 1896.

Brephos notha Three Years in the Pupa-state.—In June, 1893, I found a few larvæ of this species upon aspen, and the following April bred some of the moths. In April, 1895, I bred one, and last month another, from the same batch of larvæ.—Gervase F. Mathew.

Note on Porthesia chrysorrhœa.—Ten years ago this species used to occur sparingly in this neighbourhood, but I have not seen any since. In the spring of 1894 I found a few larvæ near Sittingbourne, but did not see any last year. This year, however, I obtained a small brood. Is this species dying out in this country? Twenty years ago it used to be abundant in most of the eastern counties, but I have not noticed it mentioned among lists of captures or duplicates for a very long time.—Gervase F. Mathew; Dovercourt, May 11th, 1896.

Argynnis niobe.—The Rev. O. Pickard-Cambridge, writing (Entom. xxix. 148) of the specimen of *A. niobe* captured by Mr. Gerrard in the New Forest, says, "Was not the so-called *niobe* afterwards ascertained to be only a variety of *adippe?*" I cannot imagine how such a mistake has got about; but even Mr. Barrett falls into it in his 'Lepidoptera of the British Islands,' vol. i. p. 166. The specimen in question, which I obtained from the Rev. Windsor Hambrough, and is now in my collection, is an unmistakable *niobe* var. *eris*, a variety which seems to be commoner than the type in some places. No one acquainted with both species could possibly mistake it.—C. A. Briggs; 55, Lincoln's Inn Fields, May 14th, 1896.

A Census of British Insects.—The first column is taken from Stephens's 'Catalogue of British Insects,' published sixty years ago. The second refers to those of the present time. Had not Stephens reckoned such a large proportion of varieties as species his numbers would not be near so high as they are, especially in the Neuroptera and Orthoptera:—

	Stephens.	Dale.
Coleoptera	3300	3280
Hymenoptera	2054	4700
Lepidoptera	1838	2090
Diptera	1671	3000
Hemiptera	704	1046
Neuroptera	370	246
Orthoptera	65	42
Total	10,002	14,404

—C. W. Dale; Glanvilles Wootton.

Note on Vanessa antiopa.—Years ago it was considered to be a stroke of fortune when a collector caught an English "Camberwell Beauty." Judge then of my astonishment, in a country-side home in Australia, to see a store-box full of this butterfly. The owner shocked my youthful dreams by making me his *confidante*. He informed me that in the old country he had done well by them. He first of all imported ova from America in hollow pieces of cane. These were duly hatched and reared. Part were turned loose in the imago, others kept for trade. Thus the specimens were bred on English soil! I remember one year four hundred being the recorded number seen or captured in England. And I further remember a noted difference between British and continental specimens, the one being of a yellow tinge, the other whiter cream. *Deiopeia pulchella* and many rare British moths swarm in Australia. How easy to send ova, and turn the imagines loose. If foreign insects caught on British shores were not reckoned to be of greater value than those at home, there would doubtless be less heard of new British species. The wonder is, with such opportunity and temptation to gain, that many more cases have not occurred.—T. P. Lucas ; Brisbane, Australia.

The New Forest Cicada.—Perhaps it will probably surprise Mr. Cambridge and other entomologists of the present day to hear that this fine species (*Cicada hæmatoides*, ante, p. 147) was taken by Mr. Bydder in the New Forest as long ago as 1815. There is an admirable figure of it in Curtis's 'British Entomology,' from specimens taken in the New Forest by Mr. Curtis and my father in June, 1831. A remarkable fact in connection with this species is that it is more than double the size of *Ledra aurita*, the second largest species of the Homoptera in Britain.—C. W. Dale ; Glanvilles Wootton, May 4th.

Cicadetta montana, *Scop.* — The question of the first recorded occurrence of our only British Cicadid having been referred to by the Rev. O. Pickard-Cambridge in his interesting paper on Brockenhurst (*ante*, pp. 146–150), I may say that the earliest record with which I am acquainted is that of Samouelle, in his 'Entomologist's Useful Compendium' (1819), where, on p. 229, he says, "The only species known to inhabit this country was lately discovered by Mr. Daniel Bydder near the New Forest in Hampshire." There can be no question as to the identity of the species, as he gives a recognisable figure of it (*op. cit.* pl. ii. fig. 2) under the name of *Cicada anglica*. — James Edwards ; Colesborne, Cheltenham, April 4th, 1896.

Notes on various Insects.—*Eulophus endocerchus*, Walk. This is a synonym of *Clinx gallacum*, L., and is a parasite of the Cynipidæ.—*Eulophus ennagamis*, Walk. This I have bred from *Coleophra flavaginella*.—*Ceratopogon candidatus*, Winn. This I have bred in number from the pith of teasel-stems. — *Ceratopogon bipunctatus*, L. This occurs commonly under elm-bark.—*Scatopse albitarsis*, Zett. This I have bred from the pith of burdock-stems.—*Dilophus vulgaris*, L. Of this I have an hermaphrodite, with the wing on the right side dark, on the other light.—C. W. Dale ; The Manor House, Glanvilles Wootton.

"Apple-trees and Wingless Moths."—In reply to Mr. Mitchell's query (*ante*, p. 127), I beg to say I have seen wingless moths by night ; in fact, since this district can claim an additional species, *Nyssia zonaria*, several of which are depositing eggs in a box as I write by gaslight, my advantages are rather exceptional. On three points Mr. Mitchell and I will agree—the females are more active by night than by day, they have longer and stronger legs than the males, and they are quite capable of walking to the end of a larger oak-branch and depositing their eggs, even although the activity of geometers by night is well known to be limited. The great question is—Do these concessions account for the wide distribution of larvæ, or, in other words, for *all* the distribution ? Clearly not, because in the correspondence on the subject (Entom. xxvi. 20) it is stated, in no hypothetical language, that males have been seen—the method is not described—to carry up the females. The statement is borne out by one of the 'Standard' correspondents, who declares, "All fruit-growers know that a small percentage of female moths will always be carried up by the males." Another goes so far as to say the cart-grease ring round the trees "is of no use at all." Here, then, is the additional aid towards wide distribution. As to why males are not frequently captured on the wing when carrying up the females, I should say it is because the species is not often netted.—J. Arkle; Chester.

Abundance of Hepialus lupulinus Larvæ, and a Parasite thereon.—The past winter has been noted for its abundance of the larvæ of the garden-swift moth (*H. lupulinus*). They have been and are still in many parts of Kent attacking the roots of various plants, especially the strawberry. Amongst those sent me I have noticed the constant habit, when attacking that fruit-plant, of eating right up into the crown of the plant, as we see in others of this genus. In the first samples sent me I failed to see any signs of the pest until the rootstocks were split up. They destroy the plants entirely, and also eat the rootlets of the runners. In the majority of instances they, however, live free in the soil, feeding upon the rootage from the outside, especially when they are attacking mint, which seems a favourite food-plant. Notices of this attack have been sent me from various places in Kent, from near Dorking, and near St. Neots. Amongst two packages sent from Canterbury and Kimbolton, I found several specimens of *Anthocoris*, which evidently destroy the *Hepialus* larvæ underground. Their method of procedure is to crawl upon the larva's back, and then plunge their beaks into the skin behind the head. Soon after this operation the larvæ seem to sicken and die, numbers that were sent me from Canterbury last month having evidently succumbed on the journey from this cause. To make certain, however, I kept a number of these larvæ with a few of the *Anthocoris* sent, and watched them in this carnivorous habit. The larvæ seemed to know what was going to take place, for the instant the "bug" got upon the back of its prey the latter wriggled backwards in that curious manner common to the *lupulinus* larvæ. This hemipteron moved about in the loose earth amongst which the garden-swift caterpillars abound with considerable ease.—F. V. Theobald; Wye Court, Wye, April 24th, 1896.

An unusual Habitat for Cossus ligniperda Larvæ in Winter.—On the 23rd of this month (April) some larvæ, full-fed, of the goat-moth were forwarded to me from Bruton in Somerset, that were found about eight or nine inches below the ground and about four feet apart, in soil that was used last year for dahlias and sunflowers, and which has been free from vegetation since. One had already commenced to spin its cocoon beneath the soil, which they continue to do, although wood has been put in the cage. The cocoon is made up of the grains of earth loosely united together with silk. Although the larvæ often leave the trees for a short time, I can find no records of them permanently taking up their abode for pupation in the ground.—F. V. Theobald; Wye Court, Wye, April 24th, 1896.

[Several instances are recorded of the pupation of the larva of this species either on or just below the surface of the ground. Sometimes it has been dug out of the earth.—Ed.]

CAPTURES AND FIELD REPORTS.

Endromis versicolor at Reading.—It is with great pleasure that I report a capture of this glorious insect, on April 18th, after some three or four hours' hard searching. I also found a couple of ova laid near the moth, and since have obtained a fair number from my captive. On the same day, and on the same ground, I saw single specimens of *E. versicolor* (male), and *Brephos parthenias*, but was unable to capture either of them. Two specimens of *Ematurga atomaria* also turned up (this I should imagine is abnormally early ?).—C. J. Nash; Pitnacree, Culver Road, Reading.

Vanessa c-album in South Wales.—While staying at Hay, Brecknockshire, this April, I took a hybernated male specimen, in good condition, of this insect, in Dany Forest, and a female specimen in Boatside Wood, on the banks of the Wye. I also saw another specimen in this wood, but was unable to capture it. Both insects were taken on dullish days, and were disturbed from the long herbage. On flying they soon settled on a tree-trunk, making their capture easy.— A. D. Simms; Birmingham, May 2nd, 1896.

Plusia festucæ: Confluent Spot Form. — I have just received a specimen of *P. festucæ* in which the spots are confluent, from Mr. J. Collins, of Warrington.—J. Arkle; 2, George Street, Chester, April 27th.

Cucullia verbasci at rest.—On April 19th I took an example of this species at rest. This is the first time I have ever met with the perfect insect in a state of nature.—W. M. Christy; Watergate, Emsworth, Hants.

New Forest, Spring 1896.— I had four days' collecting at Easter in the New Forest, with two of my brothers. The weather was very favourable, and in the day time, by searching the trunks and palings, we secured the following insects:—*Trachea piniperda*, *Xylocampa lithorhiza* (very common), *Xylina rhizolitha* (two), *Tephrosia biundularia* (plentiful), *Larentia multistrigaria*, *Hybernia progemmaria*, *Eupithecia abbreviata*. *Brephos parthenias* was only occasionally seen, but *Gonopteryx rhamni* was very much in evidence. The sallows were almost over, but yielded a good series of *Tæniocampa miniosa* and *Trachea piniperda*. We also took a few *Tæniocampa munda*, *Lobophora lobulata*, *Anticlea badiata*, and single specimens of *Oporina croceago*, *Noctua plecta* (surely an unusual visitor to the sallow bloom), *Cidaria miata*, and *Tæniocampa populeti*. A few larvæ of *Epunda lichenea*, *Cleora glabraria*, and *Ellopia fasciaria* fell to the beating-stick. — C. M. Wells; Hurstfield, The Avenue, Gipsy Hill, April 26th, 1896.

Butterflies in the Chester District. — *Pieris brassicæ*, scarce during 1894 and 1895. I saw only one female last season, and three or four males. *Vanessa urticæ*, undoubtedly abundant in 1895. *V. atalanta*, scarce; I saw only two specimens. *V. io*, much less observed than in 1894. *Polyommatus phlœas*, unusually abundant in places like Beeston Castle hill: specimens with row of blue spots, from two to four, on hind wings and parallel with inner margin of red band, common. *Cœnonympha pamphilus*, common, as usual; I took, in North Wales, a male of this species with the usual dark borders to all wings, large black apical spot on each fore wing, and two small black spots on each hind wing parallel with the inner margin of the dark border.—J. Arkle; Chester.

Macro-Heterocera in the Guildford District (concluded from page 134).—Geometræ.—**Uropteryx sambucaria.* Common. A large number bred in 1895, from a batch of ova laid by a crippled female in July, 1894. It seems very easy to get the larvæ of this species through the winter without loss; the mortality during and after hybernation was very small. Perhaps the evergreen nature of its common food-plant (ivy) may have not a little to do with it.—**Rumia luteolata.* Abundant everywhere. —*Venilia macularia.* Common in most of the woods.—**Metrocampa margaritaria.* One taken July 2nd, 1887.—**Selenia bilunaria,* A few of both broods taken.—**Odontopera bidentata.* Fairly common. A large number bred in 1893. These last are rather variable, and all somewhat small.—**Crocallis elinguaria.* Two in Aug., 1891.—**Eugonia alniaria.* Two or three in 1886.—**E. quercinaria.* Two in 1886.—*Himera pennaria.* A few.—*Amphidasys strataria.* One larva, June 13th, 1892. Imago emerged March 26th, 1893.—**A. betularia.* Fairly common.—**Hemerophila abruptaria.* Common.—**Boarmia repandata.* A few.—**B. gemmaria.* Common in most years.—*Tephrosia crepuscularia.* A few seen, May, 1894. I was unable to visit the locality in 1895.—*Geometra papilionaria.* One, June 10th, 1889. I have also seen others which have been taken in the district.—**G. vernaria.* A few. Common ten years ago.—**Iodis lactearia.* A few.—*Asthena candidata.* Very common.—*Acidalia bisetata.* Fairly common.—**A. virgularia.* Very common everywhere.—**A. subsericeata, *A. remutaria, *A. imitaria.* A few specimens of each.—**A. aversata.* Very common; both varieties taken.—**Cabera pusaria.* Very common.—**Bapta temerata.* Fairly common.—*B. bimaculata.* One, May 12th, 1894.—**Halia vauaria.* Fairly common.—*Strenia clathrata.* Abundant.—**Panagra petraria.* Very common.—*Numeria pulveraria.* A few taken; also a few bred in May, 1892.—*Ematurga atomaria.* Common.—*Bupalus piniaria.* A large number seen in July, 1892.—**Abraxas grossulariata.* Abundant, but less so than usual last year (1885).—**Ligdia adustata.* Very common.—**Lomaspilis marginata.* A few.—**Hybernia rupicapraria.* Very common; also larvæ.—*H. leucophæaria.* A few seen in 1895.—**H. aurantiaria.* A few bred, November, 1894, from larvæ found in May.—**H. marginaria.* Very common. Some of the males are more or less suffused with smoky black.—*H. defoliaria.* Common and exceedingly variable. A male taken in February, 1886. Larvæ abundant.—**Anisopteryx æscularia.* Fairly common.—**Cheimatobia brumata.* Very abundant. Larvæ very destructive—**Oporabia dilutata.* Fairly common.—*Larentia didymata.* Common. *L. viridaria.* Fairly common.—*Emmelesia affinitata.* One, April 20th, 1893.—*E. decolorata.* Fairly common.—*Eupithecia venosata.* A few.—*E. pulchellata.* Larvæ fairly common. **E. oblongata, *E. vulgata, *E. coronata.* Common.—*Thera simulata.* A single specimen.—*Hypsipetes sordidata.* Common.—**Melanthia ocellata.* Fairly common.—*Melanippe procellata.* Fairly common. *M. unangulata, *M. rivata, *M. montanata, M. fluctuata.* All common.—**Anticlea badiata.* Fairly common.—*A. nigrofasciaria.* A few.—*Coremia ferrugata.* Common.—**Camptogramma bilineata.* Very abundant; in hundreds everywhere.—**Phibalapteryx tersata.* Fairly common.—**P. vitalbata.* Common.—**Triphosa dubitata.* Fairly common.—**Scotosia rhamnata.* A few, but several years ago.

—**Cidaria miata.* A few seen in most years.—**C. corylata.* A few.—**C. truncata.* Fairly common.—**C. suffumata.* A few.—*C. prunata.* A single specimen.—**C. fulvata.* A few.—**C. dotata.* Fairly common.—*Eubolia limitata, E. plumbaria.* A few of each. —**E. bipunctaria.* Common on the chalk.—*Anaitis plagiata.* Fairly common.

I can say but little in reference to the local variation exhibited, as the material at hand (in very many cases only two or three odd specimens) is very limited. The foregoing list of 211 species can only represent a small portion (in all probability much less than half) of the total number to be found in the district. Although it includes but few species that are either local or rare, there is not the least doubt that many rarities would reward an energetic collector with plenty of the ever-needful time at his disposal, which last, however, I fear, must be counted among the desiderata of most entomologists. There are, most likely, numerous records to be found in the very voluminous literature of past years to which I have not access; but *Xylina zinckenii* (Newman, 'British Moths,' p. 428), and *Plusia moneta* (Entom. xxiv. 194; xxvii. 246), are enough to show that species of considerable rarity and interest (apart from the mere collector's point of view) have been, and are, taken in the district so imperfectly covered by this article.—W. Grover; Guildford, Nov. 1895.

SOCIETIES.

Entomological Society of London.—*May 6th*, 1896.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. Percy Evans Freke, of Step House, Borris, Co. Carlow, Ireland, was elected a Fellow of the Society. Mr. Champion exhibited specimens of *Amara famelica*, Zimm., from Woking, Surrey, a recent addition to the British list. He also exhibited, on behalf of Mr. Dolby-Tyler, a series of *Eburia quadrinotata*, Latr., from Guayaquil, Ecuador, showing variation in the number of the raised ivory-white lines on the elytra, there being sometimes an additional mark exterior to the short basal line, and sometimes an additional one on the inner side of the second line. Mr. Gahan said he did not notice anything remarkable in the specimens, except in the arrangement of the spots. Mr. Horace Donisthorpe exhibited a specimen of *Pterostichus gracilis*, with three tarsi on one leg, taken near Weymouth last month. Mr. G. T. Porritt exhibited a series of *Arctia menthastri* which he had just bred from Morayshire ova; the ground colour of the specimens varied from the usual white, through shades of yellow, and dark smoky-brown. Mr. Merrifield exhibited specimens of *Gonepteryx rhamni*, bred from larvæ found in North Italy and Germany, the pupæ of which had been subjected to various temperatures. He said that high temperature appeared to cause an increase of yellow scales in the female, and low temperatures generally reduced the size of the orange discal spot on the fore wings of both sexes. He also exhibited some bred specimens of species of *Vanessa*, the result of experiments tried with a view to ascertain the extreme of high temperature that the pupæ would bear, and its results. The species exhibited included *Vanessa atalanta, V. urticæ*, and *V. antiopa*. Mr. Merrifield said that the effects on the imago produced by temperature were being made the subject of systematic research by Professor Weismann, Dr. Standfuss, Mr. E. Fischer, and others. Mr. Elwes asked if these experiments had been made on pupæ only, or on the larvæ as well. Mr. Merrifield said that the results were only noticeable when the experiments were made on pupæ. The effect of them on larvæ was not apparent. Mr. Kirkaldy exhibited and made remarks on ova of *Notonecta glauca* var. *furcata*. Mr. Tutt exhibited living larvæ of *Apamea ophiogramma*, together with the grass on which it was feeding. He said the species was formerly considered rare in Britain, but was now found freely in any localities where ribbon-grass (*Digraphis arundinacea*) was plentiful. The Secretary read a communication from Mr. E. Meyrick on the subject of Professor Radcliffe-Grote's criticisms, contained in his paper published in the 'Proceedings' of the Society, 1896, pp. x–xv, on the use of certain generic terms by Mr. Meyrick in writing on the group of Lepidoptera known as the Geometridæ. Mr. Meyrick stated that he rejected the main assumption on which the criticisms were based. Mr. McLachlan opened a "Discussion as to the best means of preventing the extinction of certain British Butterflies." He referred to the extinction of *Chrysophanus dispar*, *Lycæna acis*, and *Aporia cratægi*, and to the probable extinction, in the near future, of *Papilio machaon*, and more especially of *Melitæa cinxia* and *Lycæna arion*. He stated that one of the objects he had in view in bringing this matter forward was to see whether some plan could not be devised to protect those narrowly localised species which were apparently in danger of being exterminated by over-collecting. Professor Meldola said he fully sympathised with the remarks of Mr. McLachlan, and he thought that a resolution passed by the Society, possibly in conjunction with kindred Societies, might produce some effect. Mr. Goss stated that *P. machaon*, although apparently doomed to extinction in its chief locality in Cambridgeshire (Wicken Fen), would probably linger on in the county in smaller fens, such as Chippenham, where the larvæ had been found feeding on *Angelica sylvestris*. It would certainly survive in the Norfolk Broads, both from the irreclaimable nature of the fens there, and the extensive range of the species in the district, which Mr. Goss said he had explored in 1887 in boats. He stated that *Melitæa cinxia*, although gradually disappearing from most of its old localities in the south of the Isle of Wight, was still found in the island further west in localities in which he had seen it in some numbers in May, 1895. He added that *L. arion* was far from extinct in Gloucestershire, and was distributed over a much wider area in the extreme south-west of England than was generally supposed. Its disappearance from South Devon was due to the burning of the grass, and the consequent destruction of the food-plant. Mr. Elwes stated that in the district in which he lived, in Gloucestershire, he had found *L. arion* in three or four places on his own property some ten or twelve miles distant from its known localities, but the species had disappeared of late years. The fact that *L. arion* had disappeared from his own property, where it was not collected, seemed to point to the fact that it was dying out from natural causes, perhaps owing to changes in climate. Colonel Irby said that *L. arion* had disappeared many years ago, not only from Barnwell Wold, Northamptonshire, but from another part of the county on the estate of Lord Lilford, not accessible to the public, and that its disappearance there was no doubt caused by the destruction of the food-plant and other herbage, by burning the pasture and by the grazing of sheep. Mr. Crowley, Mr. Tutt, Mr. Waterhouse, and Mr. Blandford continued the discussion. It was moved by Mr. Tutt, and seconded by Mr. Elwes, that a committee be appointed by the Council to investigate the matter, and to report thereon. This was carried *nem. con.* Mr. Guy A. K. Marshall communicated a paper entitled "Notes on Seasonal Dimorphism in South African Rhopalocera." Mr. P. Cameron communicated a paper entitled "Descriptions of new species of Hymenoptera from the Oriental Region."—H. Goss, *Hon. Secretary.*

South London Entomological and Natural History Society.—*April 23rd.* T. W. Hall, Esq., Vice-President, in the chair. Mr. C. A. Briggs exhibited a male specimen of *Stylops melittæ*, taken at Leatherhead on April 18th. Messrs. Barrett and Turner, series of *Triphæna comes* (*orbona*) from various localities. Mr. Adkin, his very long and varied series of the same species from many localities in the British Islands, and also specimens from Asia Minor and Europe. He then read a paper entitled "Further notes on *Triphæna comes*, with special reference to var. *curtisii*." After referring to his previous paper on the subject, he discussed at length the geographical distribution and variation of the species. Its range was from Syria in the east to the Atlantic coast on the west, and from S. Sweden and the neighbourhood of Moscow in the north to the southern shores of the Mediterranean on the south. Great Britain was its extreme N.W. limit, and here occurred the greatest variation. In Asia Minor the specimens were of a uniform clay-colour, the increase in intensity both of colour and markings being very gradual up to its extreme N.W. limit in the Orkneys, where the prevailing form was the var. *curtisii*. In Scotland the forms of variations were endless. The specimens from Scilly had scalloped transverse lines very plainly marked. He then discussed the history and distribution of the var. *curtisii*, and gave as the results of his experiments in breeding, that the species was, normally in its southern localities, continuous brooded, but in its northern limits had acquired the habit of hybernating in its larval stage. The extreme colour of var. *curtisii* may have been developed for protection, but further observations were necessary on this point. In the discussion which ensued Mr. Barrett said that the scalloped appearance of the second line was due to the coalescence of a row of dots with the slight projections of the waved line, and referred to the habit of the species of hiding under leaves, thus requiring little protective resemblance. Mr. Tutt had observed the scalloped second line in many Noctuina, and especially so in some specimens of *Nonagria lutosa* taken by Mr. Burrows. It was, he said, well known that the neighbourhood of the Moray Firth was very mild, and that its insect fauna was very like the southern forms. For protective purposes ataval forms were often returned to by insects. At Deal the species settled on the bare sand. Lately he had looked up the synonymy of the species, and was of opinion that the name ought not to have been changed from *orbona*. Mr. McArthur said that var. *curtisii* was undoubtedly protected. In the north it settled on the bare peat and among scattered heath, and was then invariably dark. Where the ground was not all dark, there he found typical forms as well as the dark one.—Hy. J. Turner, *Hon. Report Secretary.*

Birmingham Entomological Society.—Mr. G. H. Kenrick in the chair. Exhibits:—By Mr. A. H. Martineau, a willow-gall with the pupa-case of a *Cecidomyia* projecting from it; he described the manner of exit from the gall of the pupa. By Mr. P. W. Abbott, a fine series of *Spilosoma lubricipeda*, with its varieties, including *radiata* and *semifasciata;* the latter bred by Mr. Porritt, and the former by Mr. Mera. He also showed *S. menthastri* var. *ochracea* from Forres. By Mr. R. C. Bradley, a series of a curious little fly, *Pelomyza baumhaueri*, Loew, which he had found not uncommonly in one spot in Sutton Park last year. By Mr. Valentine Smith, a lot of Coleoptera, including *Amara patricia*, from near Stourbridge; *Donacia affinis*, from Kingswood; *Silpha quadripunctata*, from Sutton; *Rhopalomesites tardii*, from Lynmouth; *Calathus piceus* and *Ocypus pedator*, from Ilfracombe; and *Staphylinus erythrocephalus* and *Trox sabulosus*, from Cannock Chase. By Mr. W. Harrison, living pupæ of *Euchloë cardamines* from his garden at Harborne. By Mr. H. Foster Newey, a number of drawings in black and white of the larvæ and pupæ of British Lepidoptera, executed by himself and Mr. Rollason. They were very greatly admired for their detailed accuracy.—Colbran J. Wainwright, *Hon. Sec.*

OBITUARY.

Mr. John Anderson Cooper, whose death we briefly announced in our last issue, had attained his forty-seventh year. He was born at Thorpe, in the county of Durham, in 1849. Mr. Cooper was manager of the Leytonstone branch of Nevill's Bakery at the time of his decease, and had held that position for a period of ten or twelve years. Although his business life was an extremely active one, he still found time to devote to Natural History, in which he was greatly interested. The fine collections he formed of birds and their nests and eggs, as well as of Lepidoptera,* testify to the large amount of energy he put into the work, and the careful and painstaking manner in which he performed it. As a collector of Lepidoptera he had few equals, and it was always his ambition to make himself practically acquainted with the habits, and if possible with the life-histories, of the species he added to his collection. His knowledge, indeed, in these particulars was considerable; but although he was at all times most happy to give information to those who sought it of him, he could rarely be induced to publish anything concerning his entomological or other natural history work. He was elected a member of the South London Entomological and Natural History Society in 1884. His genial disposition and straightforwardness of character secured him many friends, by all of whom his loss will be sincerely deplored.

* We understand that the entomological collection will be sent in to Stevens's at an early date.

THE ENTOMOLOGIST

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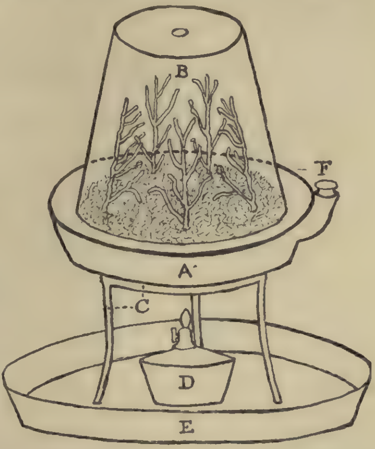
MR. STURT'S FORCING APPARATUS.

The idea of this invention was suggested to Mr. Sturt by the modern seed-incubators. It is a great improvement on that of my friend the late Dr. Boswell Boswell (better known as Prof. Syme). Its principle, which I here publish with Mr. Sturt's permission, and indeed at his wish, appears, though simple, to be as excellent in conception as I am assured it is effective in practice. Mr. Sturt kindly went to the trouble of bringing up from Kingston one of his glass flower-pots, together with an explanatory sketch and notes, and also two lovely, but small, varieties of *Sphinx convolvuli*, the result of forcing; and left them with Mr. Cooke, of Museum Street, for my inspection and information. He has since obligingly furnished me with further details on points upon which I desired to be enlightened.

The annexed figure will show the arrangement of the components of this forcing-cage:—

A represents a hot-water soup-plate.
B a glass flower-pot inverted.
C a stout wire tripod stand, similar to those used for baking meat.
D a small paraffin-lamp to burn at least twenty-four hours.
E a tin tray.



If the soup-plate A be thought to be too costly, your readers will easily, if necessary, improvise a substitute by placing an ordinary soup-plate upon a shallow tin pan; and, similarly, if a difficulty is found in obtaining the glass flower-pots, a bell-glass will answer the purpose, but it should be tilted in such a manner as to admit air below, for

Mr. Sturt considers that ventilation is important. The top of the flame of the lamp D should be about two and quarter inches from the bottom of the plate, for which purpose the height of the tripod stand should be regulated accordingly. Night lights may be used in the place of the lamp, but require more frequent attention.

In preparing the apparatus for use the sunken part of the soup-plate should be packed to the rim as tightly as possible with thoroughly damped moss; into this twigs, as shown in the figure, should be fixed, up which the insects, as they emerge, can crawl in order to expand their wings; the pupæ should then be arranged on the damp moss, and lightly covered with a thin layer of damp moss; they soon make hollows for themselves on the surface of the moss, and not unfrequently "kick off the blankets," seeming to prefer to lie bare. The metal compartment beneath the plate should now be filled through the opening F with water at about 100° F., the lamp lighted, and the whole placed away from all draught, which might extinguish the flame.

The temperature should be maintained between 90° and 110° F., but dampness should not be excessive, for Mr. S. believes that this is one of the chief causes of crippling; and he therefore contents himself with pouring only a few teaspoonfuls of water round the rim of the plate when he observes the moss becoming dry at the edges. The time occupied by the process of forcing is, in the case of *S. convolvuli*, from eighteen to twenty days. Insects should, of course, not be removed from the twigs until their wings are fully expanded.

The great use of forcing comes into play with the thin-skinned hawk-moths, and it is very interesting to watch the successive changes which take place in them. It does not answer well for the more pachydermatous pupæ, and often has disastrous effects upon such as are enclosed in tough cocoons.

H. Guard Knaggs.

London, June, 1896.

NEW EXPERIMENTS ON THE SEASONAL DIMORPHISM OF LEPIDOPTERA.

By Dr. August Weismann.

(Translated from the German by W. E. Nicholson, F.E.S.)

(Continued from p. 185.)

A closer observation shows that, even with natural climatic varieties, it is not everywhere wholly a question of the direct influence of the colour-chemistry. The southern var. *ichnusa* of *Vanessa urticæ* always has less black above in so far as spots 5 and 6 are lost, spot 4 is at least smaller, and so is the black of the hind wings; but the spots 1, 2, and 3 of the costa have not become smaller. Now, if the black of the costa behaves differently from that on the basal part of the wing, another factor must co-operate here, as I have already maintained elsewhere, and sought to explain theoretically. This can only be, as it appears to me, the influence which the previous history can exert on any particular part of the wing according to circumstances. If for a particular spot every kind of the otherwise similar ancestral determinants of the stem form were conveyed into the germ-plasm, then the normal colouring can be considerably interfered with by the action of an unusual temperature and the way cleared for a reversion to an ancestral form or to a mixed form.

The polar variety of *V. urticæ* also shows that with natural varieties other factors co-operate besides mere climatic influences. The specimens of this species from Lapland are clearly distinguished from the German specimens, but still the difference does not lie in an important alteration of the marking. Several specimens, however, of *Vanessa urticæ* from the northern island of Japan (Yezo) are known to me through the kindness of Dr. Fritze, which possess a black transverse band in lieu of the spots II. and 8; the space between these spots, with the Lapland *polaris*, is only somewhat flushed with black; here a broad deep black bridge is formed between both spots, similarly as with the Californian *Vanessa milbertii*. And this variety lives on the 43rd to the 45th parallel of north latitude. Can this then be a direct result of the climate, which is not very different from that of Southern Germany? Or must not something else, perhaps sexual selection, have co-operated with it? Is it a primitive form from which the var. *polaris* from Siberia and Lapland has been formed by the loss of the bridge between spot II. and 8? or is it the other way about, and is *polaris* striving after this var. *yezoensis* by gradual increase of the blackish shading between II. and 8? These are questions, which it is easier to ask than to answer, but which enable us to recognise how cautious we should be in the assumption of a reaction purely of temperature in a particular case.

Among the species experimented upon by me, *Pararge egeria* and *meione* present a third case of *direct alteration* by climate. With this species, as with *Vanessa urticæ*, it is nowhere a question of seasonal dimorphism, although the species produces two broods, wherever it occurs. This is simply explained by the fact that it is not the pupæ but the larvæ of the winter brood which hybernate; the pupæ, therefore, are not formed until the temperature has already become almost summer-like. Now, as the temperature which acts on the larvæ does not influence the perfect insect in colour or marking, and the conditions of temperature, which affect the pupæ of both broods, are not very different, the conditions for the development of direct seasonal dimorphism are not given, as is also the case with *V. urticæ*.

Merrifield also has recently made experiments with *Pararge egeria*, and I should very much like to be able to compare his results with my own. Apparently they contradict one another, in so far as my German brood of *egeria* were not altered by 32° C., while his pupæ, under the same treatment, produced butterflies with smaller and less sharply defined bright spots, and also with a considerably lighter ground colour.

With all respect for the great accuracy with which Merrifield obviously works and observes, I might yet suspect that the differences, which he here observes, are not far-reaching ones, but small individual variations, which are not connected with the increased temperature. I myself at first thought I saw constant differences between those specimens which were forced in the incubator and those developed at a room temperature, but, after a careful comparison of all my specimens, I saw my mistake. It would also contradict what we should expect, if our *egeria* had *smaller* spots from heat, as *meione* has them *larger*. For the rest, it is interesting to be able to confirm my earlier conjecture, that *meione* is the primary and *egeria* the secondary form, in the markings of the butterfly itself. *P. meione* has, indeed, more numerous and larger spots; thus, for example, there are five on the costa, while often only two are distinct in *egeria*. But two or three of the others may be generally recognised in *egeria* as faint indications of bright places, in the dark ground colour: "obsolete" (verloschene) spots, as the good and descriptive expression of the lepidopterists has it, which may be taken literally in this case, as these traces can only be explained as vestiges of the spots of the parent form.

Adaptive seasonal dimorphism.—I recently cited, by way of conjecture, the North American butterfly, *Lycæna pseudargiolus*, as an example of such among *larvæ*, when I was relying on the very detailed statements of W. H. Edwards He found differently coloured larvæ in the summer and autumn broods of this butterfly. Now the earlier larva is white, and, as Edwards expressly says, well adapted to the white flower-buds of its food-plant, *Cimicifuga racemosa;* but the autumn brood is yellowish green or olive-green, and lives on a plant with yellow flowers, which blooms much later—*Actinomeris squarrosa;* so it is a question of assuming this latter colouring also to be protective, and of regarding the whole as a case in which the two broods have adapted their colouring to their different food-plants. American entomologists must prove whether this is actually the case. If it is so, then it would be a typical instance of adaptive seasonal dimorphism, inasmuch as the protective significance of *both* forms is without question. With the tropical butterflies having double seasonal forms, above referred to, it would also certainly be the case, that *both* forms will have protective significance; but it is not so easy to prove, on account of the uncertainty in estimating the biological value of many of the details of markings which here come into consideration, and at all events observations are required on the spot.

I have cited *Vanessa prorsa-levana* as a hypothetic example of an adaptive seasonal dimorphism of the perfect insect, and I have relied on the remarkable similarity which the upper side of the *prorsa*-form, with its black provided with a white band, has to *Limenitis sibylla* and *camilla.* But I do not ignore the difficulties which stand in the way of a proof that this is a case of mimicry. We do not yet know whether these species of *Limenitis* enjoy an immunity, or whether they are sought after by birds, or were sought after at an earlier period. But if it could be proved that they are privileged, and that *prorsa* obtained protection by its similarity to them, it still has to be explained, how the *levana*-form has an adaptive value, and, indeed, on its upper side, which generally possesses no adaptive value among the butterflies. To be sure, I was able to show years ago, that the dark upper side of the female blues actually conferred protection, as they lay their eggs with outspread wings, and are then considerably less conspicuous than the blue males are, when they sit with outspread wings. But we do not know the habits of the *levana*-form sufficiently accurately, and if we did know them, it would still be always sufficiently uncertain whether we could regard the undoubted similarity of the upper surface to the dead leaves of the spring wood as protective.

But, as it appears to me, we cannot well conceive that seasonal dimorphism can arise, unless *both* seasonal forms have an adaptive value. Granted the *one* alone is adaptive (here, for example, the mimetic *prorsa*-form), it would therefore be conceived as arising by selection, *i.e.* the determinants (anlagen)* of their wing-colouring would have been changed little by little from the *levana*-determinants to the *prorsa*-determinants. Now if, as my theory of heredity assumes, many primary constituents of the entire individual (the "ids") are present close to one another in each germ, then, although their selection need not necessarily follow the same course, one cannot see what should prevent the collective ids, little by little in the course of generations, from containing only *prorsa*-determinants, and from the *levana*-determinants being supplanted. Now generally, if the *prorsa*-form has an advantage over the *levana*-form even only in the summer, all individuals which are not true *prorsa* will have to be rejected by degrees. These specimens, however, are just those which still contain *levana*-determinants, and in which both of the characters are mixed. In this case, therefore, the *levana*-form must wholly disappear, and both broods become similar.

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* *Anlagen* is here used as synonymous with determinant. In reference to the difficulty attending the proper rendering of *anlagen* in its various meanings, *cf.* Prof. Parker's note to his translation of the 'Germ-Plasm' (Cont. Science Series). He frequently renders it "primary constituent." Later on Prof. Weismann uses it as synonymous with "id."—Translator.

Only if the *levana* colouring were more advantageous in the spring than the *prorsa* colouring, it could and *must* remain, and, indeed, from the fact that only a part of the id contained in the germ-plasm was altered, while another part remained unaltered. There cannot well be any doubt but that *levana* is the original form, as, according to Trybom's observations, it is at the present time the only form in those places where only one brood occurs in the year, as in Siberia on the Yenesei.

But if it is not at present possible to bring forward a proof that the upper sides of *prorsa* and *levana* are to be regarded as protective colouring, yet the delicate combination and generally the kind of variability of both patterns of colour are decisively against their interpretation as direct climatic forms.

Already, in my work on seasonal dimorphism of the year 1875,* I laid stress upon the fact, that the *prorsa*-form could in no way be simply referred to an increase of the black. I there said (page 40) :—" Even in the case of species the summer form of which really possesses far more black than the winter form, as, for instance, *Vanessa levana*, one type cannot be derived from the other simply by the expansion of the black spots present, since on the same place where in *levana* a black band runs" (across the hind wings), "*prorsa*, which otherwise possesses much more black, has a white line. The intermediate forms which have been artificially produced by the action of cold on the summer generation present a graduated series, according as reversion is more or less complete; a black spot first appearing in the middle of the white band of *prorsa*, and then becoming enlarged until, finally, in the perfect *levana*, it unites with another black triangle proceeding from the front of the band, and thus becomes fused into a black bar. The white band of *prorsa* and the black band of *levana* by no means correspond in position; in *prorsa* quite a new pattern appears, which does not originate by a simple colour replacement of the *levana* markings."

This is perfectly accurate, although later on a fanatic opponent of the evolutionary doctrine simply described it as "false," and as a "want of observation."† The different stages of the conversion of the *levana*- into the *prorsa*-marking can be followed to some extent in the different forms of *porima*, and it is certainly very instructive to see that this does not in any way follow fixed principles, but is in a certain sense without rule. It cannot be said: the black increases, the yellow changes into white, but "in this place the black expands, there it is changed into white," as was shown above; the white band of the hind wings originates from black in its lower part, from brownish yellow in its upper part; the interrupted band of white spots originates, on the other hand, only out of the brownish yellow ground colour. Many of these changes, therefore, cannot possibly be simply chemical processes, induced by the action of a higher temperature on the "pigment-formers" (Pigmentbildner) of the wings of the pupa, and comparable to the reddening of blue litmus-paper in acids. All that I wrote on the subject twenty years ago I still consider fully justified: "A new marking has developed, emanating from the existing one." But while I then thought that this new formation must be always regarded as a reaction of the specific *levana*-organism to a higher temperature, I now recognise that temperature does not in general take part here as the actual cause, but that it is a question of a process of selection, which goes on independently of the temperature, and which gradually alters (umstempelte) some of the ids to the *prorsa*-ids. But these *prorsa*-ids were at the same time so arranged that they become active under the action of a higher temperature, if this is acting at the beginning of the pupal period, while the *levana*-ids become active at a lower temperature. Heat, therefore, is only the *excitant which sets free* the *prorsa*-determinants, while cold sets free the *levana*-determinants.

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* Weismann, "Studien zur Descendenztheorie. I. Ueber den Saison Dimorphismus der Schmetterlinge." Leipzig, 1875.

† Johannes Schilde, "Gegen pseudodoxische Transmutationslehren, ein Entomolog." Leipzig, 1879.

But this does not exhaust the matter. As already explained above, I formerly thought that the offspring of the *prorsa* brood always assumed the *levana*-form, even if their pupæ were subjected to a high temperature: this was not, indeed, entirely correct, but still it contained a germ of truth, so far as this second brood has a *stronger tendency* to the *levana*- than to the *prorsa*-form. This is convincingly proved by all the experiments. They *can* be changed into *prorsa*, as one of my old experiments of 1869 proves, in which the whole brood of a female of *prorsa* again assumed the *prorsa*-form under the influence of the unusually hot July sun. But in this case also the tendency of this second brood to the activity of the *levana*-ids can be recognised from the fact that many butterflies exhibited a striking amount of yellow, and were, indeed, almost *porima*. On the other hand, the first brood of the year has just as pronounced a tendency to the activity of the *prorsa*-determinants, otherwise it must be possible to always make all individuals of a brood into *levana* by cold, which I, at least, have not succeeded in doing; but generally a not quite pure form of *levana* originates in this way, often only approaches to it, viz. *porima*. If this were not so, a number of *levana* butterflies would fly in July every cold summer, a fact which has never yet been observed. But at the same cool temperature—say, 15° C.—at which the first brood would produce *prorsa* butterflies, the second produces exclusively *levana* butterflies, or at any rate a preponderance of them.

These facts, as it appears to me, force us to assume, *that an alternation of the two forms* is provided *by nature*, apart from the influences of temperature; that in the first brood the *prorsa*-ids, in the second, *i.e.* the first generation of butterflies of the following year, the *levana*-ids are predisposed to activity, and that they can only be prevented from actual activity by special outward influences. The most important of these influences is the temperature during the pupal period, which acts in such a way that many individuals of the first brood of the year can be induced by cold to assume the *levana*-, or at any rate the *porima*-, form, and almost a majority of the individuals of the second brood can be induced by heat to assume the *prorsa*-form. Apparently everything is arranged so that butterflies emerging in the summer possess the *prorsa*-form, *and, indeed, although the summer is not hot*, and that all butterflies emerging in the spring possess the *levana*-form, *although the spring is quite warm*, as is often the case with us. The experiments have shown, that *all hybernating pupæ* produce *levana without exception*, let them be subjected to ever so high a temperature.

It appears to me that by taking this view of seasonal dimorphism we obtain a more satisfactory insight into this remarkable phenomenon, than we hitherto possessed.

(To be continued.)

SILK-PRODUCING LEPIDOPTERA.

By Alfred Wailly.

(Membre Lauréat de la Société Nationale d'Acclimatation de France).

(Continued from p. 159.)

WILD SILKWORMS.

Asiatic Species.

Antheræa yama-maï, Guérin Méneville (Japanese oak silkworm). This wild silkworm, reared on a large scale in Japan, on account of the beauty and excellent quality of its silk, was introduced into France in 1861, by Guérin Méneville. Bred in various parts of Europe with more or less success, it has now almost disappeared, breeders having lost it, or given it up, to rear an easier species, *Antheræa pernyi* (Chinese oak silkworm); but new attempts are being made to rear it again from eggs imported from Japan. That which discouraged most breeders was that the eggs generally hatched before the oak buds were sufficiently developed; besides, the moths, for the most part, refused to pair in captivity. It would, however, be easy to deal successfully with these two drawbacks. I have already in former reports recommended the use of small oak trees in pots, to rear the worms till the oak buds are sufficiently developed. On the other hand, premature hatching of the worms may be avoided by placing the eggs, during the winter, in muslin bags suspended in the open air in a northern aspect and protected from the rays of the sun. As soon as the oak buds have burst open, the eggs may be submitted to a gentle and moist temperature, so that they should all hatch as rapidly as possible. With respect to the other difficulty, that of the pairing of the moths, the cages containing the latter should be placed in the open air, and even tied to branches of trees, when this is possible. In rooms the *yama-maï* moths pair with the greatest difficulty, and it is the same with many other species. Of course cages containing moths must be protected from would-be enemies.

Like the ova of *Bombyx mori*, *A. yama-maï* ova are naturally preserved all the winter, and hatch in the spring. But in reality there is a notable difference between the two species. The eggs of *B. mori* only contain a germ during the winter; they remain liquid. It is only in the spring, after the eggs have been submitted to the heat, that the larva is formed and hatches after it is fully developed. The fertile *yama-maï* ovum, on the contrary, contains a larva which is formed about three weeks after the laying, and this larva, fully developed in the month of August or September, remains in the ovum till March or April, and sometimes later, before hatching. Therefore *Bombyx mori* hybernates in the ovum state and *yama-maï* in the larval state.

Ova of the other silk-producing Bombyces which I have bred could never hybernate; they always hatched a few weeks after they were laid or the larvæ died in the egg, if the weather was too cold for them to hatch. The eggs of the second brood of *Antheræa pernyi* and *Attacus cynthia*, for instance, laid in October, were never of any use for the following spring, and it was the same respecting the eggs of *Antheræa mylitta*, *Attacus atlas*, and others.

Ova of the *yama-maï* in the southern parts of Europe may hatch in March; in central parts they hatch in April, in northern parts in May, and in Scotland in June. All depends on the temperature of the various countries; besides, the hatching of the eggs, like the emergence of the moths from the pupæ, may be retarded or accelerated by the variations of temperature, as is the case with our native Lepidoptera.

It is the same with respect to the duration of the rearing of the various species; no time can be specified, unless a uniform temperature can be obtained. Once, in London, in the open air, the duration of a rearing of *yama-maï* larvæ lasted one hundred and ten days; on the contrary, a rearing made in a conservatory, at a temperature of 25° to 27° Centigrade, lasted only about one month.

Attacus cynthia, Drury (Ailanthus silkworm). Introduced into France by Guérin Méneville in 1858, its cultivation spread through Europe, in parts of Africa and America, and even in Australia. This species, with an open cocoon like all those of the same genus, is naturalized in France and the United States of North America. Besides the Ailanthus (*Ailanthus glandulosa*), *Attacus cynthia* can be reared on the castor-oil plant (*Ricinus communis*), lilac, laburnum (*Cytisus laburnum*), barberry (*Berberis vulgaris*), cherry, &c.

Cynthia moths generally emerge about the end of June, and the eggs hatch, at the ordinary temperature, about a fortnight after they have been laid. In hot climates this species becomes bivoltine, and even polyvoltine. A native of China, *Attacus cynthia* is also found wild in India all along the Himalaya range, in Assam and other parts, where it feeds on various plants. The moths pair easily, and the larvæ are very easy to rear in the open air in England and other northern countries.

Antheræa pernyi, Guérin Méneville (Chinese oak silkworm). This valuable species, with a large closed cocoon of rich silk, is, with the preceding species, the easiest to rear in the open air in northern countries. The moths pair easily in captivity, and in any situation. The species is single-brooded in the northern parts of Europe, and double-brooded in the southern parts. In South Europe the moths may emerge from March, in central and northern parts from April and May; sometimes they will emerge in June. The rearing in the open air lasts from six to eight weeks, and sometimes longer.

Pernyi larvæ may be reared on plum and apple trees, but they do not thrive well on these, as far as my experience goes. One of my correspondents in Illinois, U.S.A., however, wrote to me, some years ago, that he saw his *pernyi* larvæ of the second generation leave oak trees, of which the foliage had become hard and tough through the great heat and drought, go and feed on hawthorn bushes; others were found in a garden on apple trees, where they had reached an enormous size.

(To be continued.)

ENEMIES OF HUMBLE-BEES IN NEW ZEALAND.

By W. W. Smith.

Among the many animals introduced into New Zealand by the Canterbury Acclimatisation Society, the humble-bee may justly claim first honours in their order of merit. Since the ninety queens were liberated at Christchurch, N.Z., nine years ago, the sum of about £200,000 has been realized on red clover (*Trifolium pratense*) seed alone. Their rapid establishment and phenomenal dispersion over the South Island are, I believe, well known to entomologists. In New Zealand, as in Europe, they are subject to fluctuations in the seasons, and to several enemies. Last winter (May to August) was perhaps the severest on record in the South Island. Snow two inches deep lay on the Canterbury plains for several days, while sharp frosts were experienced every night for a fortnight. Deeper snow and harder frosts were also experienced in nearly all the upland and alpine country. As a result the humble-bees were not so numerous during the present as in the two previous summers; nor have their labours been quite so beneficial in fertilizing the red clover. Good results may, possibly, follow an occasional severe winter in preserving and perpetuating hardier forms of the race.

Favourite and comfortable places for the humble-bees to hybernate in are the raised banks beneath gorse hedges, and the cavities about the roots of *Pinus insignis* growing on the plains. It is, however, more their enemies in New Zealand I now desire to refer to than to their general history. For two seasons we have found numbers of dead humble-bees with a small puncture either in their thorax or abdomen. On the 9th January of the present year I was fortunate in ascertaining the cause of these punctures, and in witnessing the death of a humble-bee. I was admiring a fine group of antirrhinums in bloom, on which several queens and neuters of *Bombus hortorum* var. *subterraneus* were working. Instantly a queen was seized by a large Dipteron (*Asilus varius*), both falling together to the ground. The *Asilus*, although inferior in size to the humble-bee, was able to hold it on the ground, to pierce the fore part of the thorax, and kill the bee in a few seconds by sucking out the viscera. In both America and Europe the carnivorous habits of the Asilidæ are well known, especially their destruction of hive-bees. They have likewise become troublesome about hives in this district every summer. Although my small entomological library contains no records of *Asilus* destroying humble-bees in Europe, I may suppose they do exist.

Another enemy of humble-bees here is the introduced English starling. Last nesting season we noticed them several times capturing and carrying the bees to their nests to feed their young. Excepting fragments of the bees' wings, we were unsuccessful in finding other portions of their bodies in the exuviæ around the nests. In many of the agricultural and pastoral districts of New Zealand, the starling's services are invaluable as destroyers of injurious insects. It is, therefore, regrettable that these birds now attack the humble-bees. Up to the present I have not observed any of the native birds attacking them in this district.

Ashburton, N.Z., April, 1896.

[Mr. Edward Saunders (Ent. Mo. Mag. xxii. 94) records the occurrence of a number of dead or dying humble-bees on the ground under a lime tree in August, 1885. "Nearly every specimen appeared to have been killed in the same manner, having a large hole in the upper surface of the thorax, and another at the apex of the abdomen, the apical segments being removed." For some time he was unable to discover any clue to the possible cause of mutilation; but at length he noticed the carcase of a bee to fall from a branch of the tree upon which a bird, subsequently determined to be the great tom-tit, was disporting itself. The writer adds:—"Although I have no positive evidence whereby to convict *Parus major*, I think the probabilities of his being the culprit are so strong that it is hardly necessary to seek further for the murderer of these humble innocents."—Ed.]

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 162.)

Cucullia umbratica, *L.*—Universally common, and variable in colour and markings. Var. *tanaceti*, Haw., seems to correspond with a large number of our males, and many of our females would rank as var. *lucifuga*, Haw. Var. *lactucæ* is a not uncommon form also, of dark grey streaked with lighter; the hind wings brown, with a paler base.

Gonoptera libatrix, *L.*—Common in most localities.

Habrostola tripartita, *Hufn.*—Widely distributed, but rarely numerous, so far as my experience goes. In most places more common than *H. triplasia*. Some examples have the ground colour dark brown, but in others it is almost black. The var. *urticæ*, Hb., which approximates the latter species in the suppression of pale markings, I have not met with. Localities:—Howth, &c., Co. Dublin; and in Co. Wicklow; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Co. Westmeath; Drumreaske, Monaghan, rare; Favour Royal, Tyrone, rare; Sligo, rather abundant (*R.*); Coolmore, Co. Donegal (*J.*); about Derry, rather rare (*C.*); Carlingford and Castle Bellingham, Co. Louth (*Thornhill*); Enniskillen, rare; common near Belfast (*W.*); Clonbrock, common (*R. E. D.*), and at Ardrahan and elsewhere in Co. Galway.

Habrostola triplasia, *L.*—Widely distributed, but somewhat scarce. Derry, abundant (*C.*); Castle Bellingham, Co. Louth, abundant (*Thornhill*); Belfast, abundant (*W.*); Carlingford and Armagh, scarce (*J.*); Coolmore, Co. Donegal, scarce

(*J.*); one at Galway (*A.*); Ardrahan (*Harker*); Clonbrock, two (*R.E.D.*); Sligo (*R.*); Markree Castle, a few; Tempo Manor (*Langham*); Drumreaske, Co. Monaghan, a few; Cromlyn, Co. Westmeath (*Mrs. B.*); Kenmare, Co. Kerry, &c.

Plusia illustris, *Fab.*—A specimen of this rarity in good condition was netted flying to bramble-flowers at Castle Kevin, Annamoe, Co. Wicklow, in August, 1887, by Miss Alice Hull, daughter of Prof. Hull, F.G.S., who had taken the place during the summer of that year. She was unaware of her prize, which she gave to the National Museum, until Mr. Carpenter, F.E.S., identified it. The only British captures (in Wales, and by a Mr. Pratt on Salisbury Plain) took place previous to 1811, since which no further records are known. That the insect has not again been taken in Ireland proves nothing, considering the plentiful lack of Irish entomologists; and it may eventually prove to be indigenous, and not a stray visitant; as in more than one instance—such as *Plusia bractea* and *Dianthœcia cæsia*—species for many years known as Irish from single specimens, have proved to be plentiful when sought for. In France it inhabits the mountains of Dauphiné, the Hautes and Basses Alpes, the Pyrenees and Doubs (*Bruand*), and is not rare, the larvæ feeding on various species of Aconite, &c., like that of *P. moneta.* As the common monkshood is widely cultivated in cottage gardens, there is no difficulty (as has been proved in S.E. England in the case of the latter species) in regard to a supply of a suitable food-plant in Ireland.

Plusia chrysitis, *L.*—Abundant in most places. The Linnean type has the two metallic-green areas separated by the unbroken median brown band (*Tutt's Brit. Noct.*). In Ireland, as in England, however, this is a rare aberration. In some specimens the metallic sheen is more blue than green, but I have some doubt if this is the case in really fresh specimens.

Plusia bractea, *Fb.*—Very widely distributed, though apparently somewhat local. In suitable seasons it is abundant in some localities. The metallic blotch varies somewhat in shape, and in some instances inclines to a silvery tint. A second brood was noticed by Miss Reynell on Sept. 5th, 1893, at Killynon, Co. Westmeath, where, and at Cromlyn (*Mrs. B.*), it is generally plentiful. Trim, Co. Meath (*G. V. H.*); Cabra, Howth, and Dundrum (*Low*), Co. Dublin; Co. Wicklow (*B.*); Mullingar (*Wilcox*); Johnstown, Co. Kilkenny (*S.*); Glandore and Ballinadee, near Bandon (*D.*), Co. Cork; Cappagh, Co. Waterford (*Miss V.*); Kenmare, Co. Kerry; Lisdoonvarna, Co. Clare; and Killaloe, not rare; Westport, Co. Mayo (*W.*); Knocknarea, numerous (*R.*), and Markree Castle, Co. Sligo; Clonbrock, abundant (*R.E.D.*), and one at Galway (*A.*); not rare near the town of Donegal.

Plusia festucæ, *L.*—Found in most localities, but seldom abundantly. The ground colour is sometimes a very deep brown, wholly obscuring the neuration in the central wing-area. The two metallic central patches are most variable in size and shape, sometimes very widely divided, and sometimes only by a line. I have taken it in the extreme north, as well as in Co. Cork, and it is widely spread throughout Central Ireland. A second flight has been often observed in September by myself and others.

Plusia iota, *L.*—Local, and by no means usually common. Mr. Maurice Fitzgibbon took a very pretty salmon-tinted specimen at Howth (? var. *ancora*, Frr). The gamma-mark is sometimes very minute in var. *percontationis*, Tr., but I have never seen a specimen in which it was obsolete. Found widely in Cos. Dublin and Wicklow; Castle Bellingham, very numerous (*Thornhill*); Armagh (*J.*); near Derry (*C.*); scarce at Clonbrock, Co. Galway (*R. E. D.*); Sligo, and Drumreaske, Co. Monaghan; not rare in Co. Westmeath.

Plusia pulchrina, *Haw.*—The commonest species except *P. gamma*. The ground colour varies from a rich yellowish brown to a fine purple, variable in strength of tone. Below the oval metallic spot is another of deep orange colour in most examples.

Plusia gamma, *L.*—Extremely common everywhere. Rarely fresh specimens occur with pale ground colour like that of hybernated examples. Some years ago I noticed this moth in swarms on the bare shaven sward of Dursey Island, off the Kerry coast, flying to the thrift flowers; and, as the locality is a very unlikely one for this species to breed in abundance, it would suggest a migration.

Plusia interrogationis, *L.* — Common on many heathery moors and hillsides in Ireland. Our specimens seem to be somewhat brighter in ground colour than Scottish, which are blacker. When freshly emerged the violet-purple tint is very handsome. One specimen I took at Mote Park, Roscommon, is very pale in ground colour, with the transverse lines and markings very striking and broad, as well as the interrogation marking, which is extraordinarily large and massive. In some specimens, however, it becomes almost obsolete. The larvæ are conspicuous and easily found both by lamplight and in sunshine, but are very subject to ichneumons. Localities:—Altadiawan, Co. Tyrone, not rare; Tempo Manor, Enniskillen (*Langham*), do.; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Co. Westmeath, do.; Ballinasloe, very common (*Hon. Emily Lawless*), and Mote Park, Roscommon; Hollybrook (*Miss ff.*), Markree Castle, and L. Gill, abundant, Co. Sligo; Kilderry, near Derry, not rare (*C.*)

(To be continued.)

NOTES AND OBSERVATIONS.

"Fungi parasitic on Butterflies."—In reference to the paper on this subject (*ante*, p. 170), it may save some perplexity if I inform entomologists that the structures described in the paper are those called battledore scales, or male plumules, or androconia. As no allusion is made in the paper to the fact that the structures are those known and figured by so many entomologists, and as this was pointed out at the meeting of the Society at which the paper was read, it is desirable that this statement should be made.—D. S.; p. C.N.H. Soc.

If Mr. Rickard, who contributes to the June 'Entomologist' an article with the above heading, had ever studied the androconia of butterflies, he would have at once understood why his supposed "fungi" were confined to the male sex of the insects examined. We recommend his examination of Wonfor's articles and illustrations in the 'Journal of Microscopical Science,' new series, vols. viii. and ix.—Samuel H. Scudder; Cambridge, U.S.A., June 7th, 1896.

Gynandrous Ino (Procris) geryon.—I went out, on June 1st, to get a few specimens of this insect for friends, and found males largely predominating in numbers. Whilst hunting up sufficient females to make the numbers even, I took one insect which had a normal male feathered antenna on the right side and a slender female one on the other. On setting this specimen, I found that the right wings were a shade longer and larger than the left, which seems corroborative evidence of hermaphroditism. I do not find that the sexes in this insect are exactly similar in size, the males being a trifle the larger. I am not sufficient of an entomologist to know if the above is conclusive evidence of hermaphroditism, or to be able to supplement it, or even to be aware if the case is at all unusual.—Henry H. Slater; Thornhaugh Rectory, Wansford, Northants.

[The specimen is certainly gynandrous ("hermaphrodite"). In the 'Wiener Entom. Zeitung,' 1884, there is a figure of an example of *Ino ampelophaga*, in which the abdomen appears to be that of a female, whilst the right antenna is distinctly male and the left antenna female in character.—Ed.]

CAPTURES AND FIELD REPORTS.

Notes on the Season from the Chester District.—A torrid summer in 1895, followed by a winter that would have done duty for the South of France! Cheshire newspapers recorded the appearance, out-of-doors, of butterflies in January! I captured my first, in the open, on February 11th—a hybernated *Vanessa urticæ*. Long before that date, as early as February 3rd, *Phigalia pedaria* (*pilosaria*) had been common enough on our gas-lamps. I continued to take the species in Delamere Forest, from oak-trunks, by day, until April 11th. The captures showed the usual range of colour variation—from pale grey with indistinct markings to specimens strongly marked, and thence on, but rarely, to unicolorous and almost black ones. *Hybernia rupicapraria* I saw on the gas-lamps, Feb. 8th. One of the surprises of the season here has been the scarcity of

H. leucophæaria. Taking Delamere Forest as representative ground, I captured two on Feb. 8th, four on Feb. 22nd, and five or six (the last) on March 7th—including a pale grey form with the markings in barest outline. *Nyssia hispidaria* has also been scarce with us. I did not find it before March 7th, when I took a couple of males developing their wings on oaks about three feet from the ground. On March 28th I found a third and last specimen—another male—at rest on a beech. *H. progemmaria* and *Anisopteryx æscularia* appeared on the gas-lamps, Feb. 20th; but the latter moth has been altogether less plentiful than in previous years. The sooty, unicolorous form of *H. progemmaria* var. *fuscata* was a frequent visitor at the gas-lamps. *Larentia multistrigaria* turned up in Delamere Forest—the first on Feb. 22nd. At the beginning of April this species was succeeded by *Lobophora lobulata*, a moth which is sometimes mistaken for *L. multistrigaria* from its similar appearance and habit of resting by day low down on palings or oaks. *Asphalia flavicornis* I took from March 7th to the end of the month. Although I followed Mr. Hamm's hint (Entom. xxviii. p. 182), and worked for it systematically, I did not find the moth more abundant than in my previous experience. *Diurnea fagella* was abundant on the forest oaks from March 28th to April 18th, when it was nearly over. I got a nice series, which showed the colour gradations from nearly white and slightly marked to almost unicolorous and black. Of *Amphidasys strataria* (*prodromaria*) I picked a paired couple from an oak on March 28th, and another couple from an oak on April 4th. This species I specially sought for, and its scarcity can be gauged when I say the two pairs were the result of ten hours' hard work. The most interesting catch in the early months was *Tephrosia biundularia*, in Delamere Forest, from March 28th till the end of April. This was the spring brood, which I had never met with before—in fact, I had not seen the insect at all for the last four or five years. As a rule, the Delamere forms range from brownish- or ochreous-grey to almost black. There is a well-defined, white, zigzag line parallel with the margins of all the wings; and one, sometimes two, black, outward-bent zigzag lines, less distinct, cross the median portions. But the type, or a very near approach to it, occurs in the forest as well, though rarely. I have only seen one of these—a very beautiful specimen taken by Mr. Crabtree, of Manchester, on April 18th. Equally associated with the season's captures of this interesting moth is Mr. Hargreaves (Mr. Cattermole) of Mr. W. J. Lancaster's "Private Secretary" Company, whose frequent companionship I had the pleasure of enjoying during March. This gentleman obtained some specimens which I think may justly be described as almost, if not quite, black in ground colour. Since then common insects have indeed been common and early up to this very hot June. Amongst them I may mention an abundance of that lovely geometer, *Timandra amataria*, by marshy ditches near Chester. I took the first on May 27th. The pink borders and stripe were very conspicuous in some examples, whilst in others they are nearly absent. Just as abundant, about ponds and marshes during the latter part of May and beginning of June, was the more sombre wainscot-coloured *Phibalapteryx lignata.*—J. Arkle; 2, George Street, Chester.

Anosia plexippus in Hampshire.—In the 'Field' of June 6th, Mr. E. G. B. Meade Waldo reports having seen, on May 28th last, a fine fresh specimen of *Danais chrysippus* in a field of trifolium close to his house at Lymington. The specimen seen was evidently *Anosia plexippus*, and the note is of especial interest, as I believe this to be the first instance of this species having been seen so early in the year. In the years 1885–6 several specimens were observed, all of which were, so far as I am aware, noticed during the autumn.—F. W. FROHAWK.

NOTES FROM WALES.—I was fortunate to take a nice black variety of *Tephrosia crepuscularia* on April 28th in this district. With the exception of a pale waved line on the hind marginal area of fore and hind wings, there are no other markings. The pale form has been common and is still out. It appears to be a good season for Lepidoptera. I have been pleased to again see *Pieris brassicæ* in fair numbers; it had been very scarce since 1893. Larvæ are very abundant, especially on oak. Those of *Pœcilocampa populi*, of which I have seen many, have been much infested with ichneumons. The almost general feeder, *Bombyx neustria*, is to be seen nearly everywhere.—T. B. JEFFERYS; Langharne, Carmarthenshire, June 1st.

PLUSIA MONETA AT WATFORD.—A fine specimen of this lovely moth was taken by Mr. Arthur Cottam, on June 19th, at about 10 p.m., flying over honeysuckle in my garden.—C. E. FRY; Watford, Herts, June 22nd, 1896.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON. — *June 3rd*, 1896.—Dr. D. Sharp, F.R.S., Vice-President, in the chair. Mr. Gervase F. Mathew exhibited the new species of Leucania, *L. flavicolor*, recently described by Mr. Barrett (Ent. Mo. Mag., 2nd series, vol. vii. p. 99), and also the varieties of *L. pallens* noticed by Mr. Barrett in the same article (*l. c.* p. 100). He also exhibited a remarkable variety of *Mamestra abjecta*, which bore a close resemblance to *Apamea gemina* var. *remissa* and to *Hadena genistæ*, and a bred specimen of *Eupithecia castigata* (?), with nearly the whole surface of the wings (the margins excepted) denuded of scales. Mr. Elwes exhibited a collection of butterflies taken in the neighbourhood of Gibraltar during last April, and said that he had found the district very unproductive, owing to the great drought. Mr. J. J. Walker remarked that Mr. Elwes had been very unfortunate, as during three spring seasons his experience had been very different; at the same time it seemed to be agreed that Spain, as a whole, was not so rich in Lepidoptera as in other orders of insects. Dr. Sharp exhibited, on behalf of Mr. Hampson, specimens of the female of *Oiketicus crameri*, recently sent by Mr. Dudgeon from Sikkim. The females in this species are so maggot-like that it is difficult to recognise them as perfect moths. There were also two pupa shells, one of which was used as a receptacle for eggs, and in the other eggs had hatched, so that it had the appearance of a pupa filled with young larvæ. Mr. R. W. Lloyd exhibited a specimen of *Athous hæmorrhoidalis*, from Savernake Forest, Wilts, with a curious malformation of the right antenna. Mr. Waterhouse exhibited several branches of oaks from the New Forest entirely denuded of foliage, and stated that throughout large tracts of the Forest the oaks had been stripped of their leaves in the same fashion by lepidopterous larvæ, especially *Cheimatobia brumata*, *Hybernia defoliaria*, and *Tortrix viridana*. Certain trees, however, though situated among the denuded trees, had quite escaped. Dr. Sharp suggested that they belonged to a different species; but Mr. Waterhouse said that he had carefully examined them, and that this was not the case. Mr. McLachlan said that the immunity of the trees referred to was probably due to irregularity in coming into leaf. The discussion was continued by Mr. Elwes, Mr. Champion, Mr. Blandford, Mr. Jacoby, and others. Mr. Tutt exhibited living pupæ of *Enodia hyperanthus* and *Epinephele ianira*, and pointed out how different the pupæ of these two species were in general appearance, structure, and cremastral attachment from each other. He pointed out that these two species had for a long time been erroneously placed in the same genus, but that, in all stages, they were widely separated, and that not only should they be placed in different genera, but that they appeared to belong to different tribes—*Enodia hyperanthus* being in the Cœnonymphidi and *Epinephele ianira* in the Epinephelidi (*vide* Entom. Record, vii. p. 301). He also exhibited living pupæ of *Thecla pruni* which had been sent to him by Mr. H. Mousley. He called attention to the great resemblance that the pupa bore, in its dorsal aspect, to a bird-dropping. Black in ground colour, the two whitish prothoracic patches, and the similarly coloured metathoracic patch which extended transversely across the constricted waist, give it a resemblance that cannot be misunderstood. Mr. Blandford exhibited live specimens of *Callidium variabile*, L., bred from the bark of beech timber from Blenheim Park. Mr. A. J. Chitty exhibited two specimens of *Osphya bipunctata*, F., taken by himself and Mr. J. J. Walker at Chattenden Roughs, and two species of *Psylliodes cyanoptera*, Ill., from Wicken. Canon Fowler exhibited specimens of *Xyletinus ater*, Panz., taken by Dr. Chapman in Herefordshire; this was the first time this beetle had been recorded from this or the neighbouring counties. Mr. Blandford exhibited and described series of Tropical American butterflies from the Godman-Salvin collection, arranged to show the existence and geographical distribution of homœochromatic groups. Mr. Elwes characterised the exhibit as the most interesting that had been before the Society for many years, and hoped that the series would not be broken up, as was intended, until an opportunity had been found for full discussion of the various questions raised. The latter point was also urged by Dr. Sharp and Col. Swinhoe, and at the conclusion of the meeting Mr. Blandford announced that Mr. Salvin had kindly consented that the series should be kept intact in order that it might form the subject of a special discussion later in the year, and that he himself would defer the publication of his remarks in view of the anticipated re-opening of the matter. Mr. Tutt having carefully examined the specimens of *Leucania flavicolor*, said that he considered it as highly probable that it was a remarkable form of *L. pallens*, but that more material was required before a final opinion could be formed. The remarkable transverse (elbowed) line of dots crossing the fore-wings was exactly parallel with that of *L. straminea* and *L. impura* ab. *punctalinea*, and for an aberration of this character to occur in *L. pallens* was as probable as in *L. impura*, the typical form of which is but sparingly dotted in the direction of the elbowed line. The hind wings showed almost identical characters in the dark shading, traces of dots in nervures, &c., as the red-aberrations of *L.*

pallens exhibited by Mr. Mathew. He considered that until the matter of its specific distinctness was finally settled, Mr. Barrett had erred on the right side in giving it a distinctive name, even if the name subsequently fell as an aberration of *L. pallens*. Dr. Chapman communicated a paper "On the Phylogeny and Evolution of the Lepidoptera from a pupal and oval standpoint."—W. W. Fowler, *Hon. Sec.*

South London Entomological and Natural History Society.—*May* 14*th*, 1896.—R. South, Esq., F.E.S., President, in the chair. Mr. Enock exhibited specimens of two very rare aquatic Hymenoptera, *Prestwichia aquatica*, which uses its legs in swimming, and which has not been recorded since its first capture in 1865; and *Caraphractus cinctus = Polynema natans*, which uses its wings in swimming. Mr. R. Adkin, a bred series of *Melanippe hastata*, from Sutherland, with series of the same from Sussex and Co. Cork; the larvæ of the first were fed on *Myrica gale;* the Cork series had a pale ochreous tone instead of the usual dead white ground; the southern series were very uniform, whereas the northern examples varied considerably in the black markings. Mr. Barrett, series of *Abraxas ulmata* and *Pieris rapæ* var. *cruciferarum*, from Japan. The former were of the British type, but the latter equalled *P. brassicæ* in size, had a considerable suffusion of black from the base, and in some of the females a partial fusion of the spots. In the discussion which ensued it was suggested that it might be the result of abundance of succulent food. Mr. Carrington remarked on the hardy constitution of the species in Canada, where it experienced extremes of temperature from 60° to 138° Mr. Tutt noted the oscillation in abundance and rarity of *P. rapæ* in America, where it had survived after a great struggle with a closely allied indigenous species, with which it was supposed to have interbred, and which was now very rare. Mr. Tutt exhibited, for Mr. Merrifield, a number of specimens bred under various degrees of heat and cold—*Aglais urticæ*, *Pyrameis atalanta*, *Euvanessa antiopa*, and *Gonepteryx rhamni*. He described the variations in detail, and remarked that it was mainly the upper sides which had been affected, whereas the under sides, which in the Rhopalocera were developed for protection, were but slightly influenced. *T. orbona* (var. *curtisii*) and these species were not parallel cases of variation, as in the former it was the upper side that was protectively coloured. Mr. Tutt read a paper entitled "Is Cold the cause of Melanism in Scotch specimens of *Triphæna orbona?*" in which he showed, by magazine references, that the area of distribution of var. *curtisii* was by no means the coldest portions of the country, and that there the sallows flowered quite as early as in the South of England. He was of opinion that the variation was wholly brought about by utility, that the species was protectively coloured. In the subsequent discussion several members considered that the dark variation in this species was a return to the ancestral form, and that every evidence showed that the processes of evolution were still in progress.

May 28*th*.—C. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. A. H. Bartlett, M.A., 34, Vanbrugh Park, Blackheath, was elected a member. Mr. McArthur exhibited a bred series of *Hypsipetes ruberata* and *H. trifasciata*, from Hoy, which as imagines were inseparable. The latter species was reared on heath; also, from the same locality, *Eupithecia venosata*, *E. pulchellata*, *Melanippe fluctuata* var. *neapolisata*. Mr. Warne, the curious wine-glass-shaped cocoon of a spider, said to be probably *Agelena brunnea*, found suspended among heather in the New Forest. Mr. Sauzé, a small specimen of *Sinodendron cylindricum*, taken by Mr. Adkin at Worthing; and *Ledra aurita*, one of the remarkable Membracidæ; *Silpha quadrimaculata*, *Hippobosca equina*, and *Hoplia philenthus*, all from the New Forest. Mr. West, on behalf of Mr. McArthur, specimens of *Chrysomela arvensis* and *C. sanguinea* from Hoy, with *C. distinguenda* from the South of England, for comparison with the local northern *C. sanguinea*. Mr. Edwards, a twig of fir containing the nodule and larva of *Tortrix piceana*, from Brockenhurst. Mr. Filer, larvæ of *Pœcilocampa populi*, and *Trichiura cratægi*, from Epping Forest. Mr. Montgomery had had a large brood of larvæ of *Saturnia carpini*, of which a very considerable number were attacked by ichneumons. Mr. Adkin remarked on the abundance of parasites he had seen in his garden and elsewhere. In reporting on the Field Meeting at Brockenhurst, Mr. Edwards said that imagines were more plentiful than last year, and that larva-beating was very successful. The weather was fine, and some twelve members were in attendance during the three days. *Macroglossa fuciformis* and *M. bombyliformis* were both captured. Larvæ of *Limenitis sybilla*, *Catocala promissa*, *C. sponsa*, *Tæniocampa miniosa*, *Spilosoma mendica*, *Thecla quercus*, and *T. betulæ* were among the species found.

June 11*th*.—C. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. Manington, 141, Broomswood Road, Wandsworth Common, was elected a member. Mr. Lucas exhibited specimens of *Ichnura elegans*, *Pyrrhosoma minium*, and a series of *Platetrum depressum*, including a male which had not developed the blue colour characteristic of the sex. They were taken by Mr. Turner at Folkestone on May 17th. Mr. West, of Streatham, a series of *Macroglossa fuciformis*, taken at Brockenhurst during the Whitsun Field Meeting. Mr. Barrett, the specimens of the new Noctua, *Leucania flavicolor*, recently described by him, and which were captured on the coast of Essex by Mr. G. F. Matthew. It was apparently allied to *L. pallens*, from which it differed not only in colour and markings, but also somewhat in the shape of the wings. It was thought that if the exhibit were again brought up, after members had examined their own series, a discussion could take place. Mr. Barrett also exhibited several beautiful bright uniform red forms of *L. pallens* from the same locality; a very large and dark specimen of *Mamestra abjecta*, and a very beautiful var. of the same, having all the markings clear and distinct upon a light ground; a var. *remissa* of *Apamea gemina*, and a specimen of *Hadena genistæ*, to both of which the var. of *M. abjecta* was comparable in many respects. Mr. N. E. Warne, a series of *Procris statices*, from Keswick, and a few specimens of *Emmelesia adæquata* (*blandiata*), one of which had the central band almost complete. Mr. Tunaley a specimen of *Enupis tesselata*, having in its grasp a *Tipula*, which it had captured. The middle legs of the *Enupis* clutched the shoulders of the wings of the *Tipula*, the hind legs were bent under the wings and body, while the fore legs of the *Enupis* were free to grasp any support. The *Tipula* was thus held in a vice, and frequently lost its legs in the struggle.

The *Empis* repeatedly pierced the thorax of the *Tipula* with its lancet, but was not always successful, owing to the struggles. This could easily be observed if the insects were placed together in a small box. He also exhibited an asymmetrical form of *Coremia designata*, from Ranmore, having the band of the right primary narrower than usual, but filled in completely with the dark colour. The inner margin of the band was more straight than in normal specimens. Mr. Mansbridge, a specimen of *Syrichthus malvæ*, having a notch at the apex of all the wings, in which the cilia were present, but shorter than usual. A discussion ensued, some members considering it to be caused by an injury to the pupa, and others thought that the cilia were shorter than usual, and that the proximity of the white patch somewhat accentuated the appearance of the notch. Mr. Edwards, a specimen of the rare *Papilio danisepa*, from the Khasia Hills, and a short series of *Leptocircus curius*. He then read a few notes on the very aberrant genus of the Papilioninæ, *Leptocircus*. After enumerating the species, and stating the characters by which it differed from the other genera of the family, he described its distribution, and quoted the opinions of the various collectors that the species were mimics of species of Neuroptera both in their appearance and habits. It was noted by various members that the defoliation of the oaks was this year not so much due to the attacks of *Tortrix viridana*, but to the larvæ of the different species of *Hybernia*. It was also remarked that oaks having bright green foliage had comparatively escaped attack, but that trees which had leaves of a dark brownish green were mostly completely stripped. — Hy. J. Turner, *Hon. Report Sec.*

Correction.—In report of April 23rd (*ante*, p. 199), delete "The extreme colour . . . . . on this point," and insert, "He considered that the evidence pointed to cold being one of the chief factors in the darkening of the species in its northern localities." Add at the end, "In his reply Mr. Adkin thought that although the extreme colour of var. *curtisii* may have been developed for protection, much further observation was necessary before it could be proved."—H. J. T.

Birmingham Entomological Society.—*April 20th*, 1896.—Mr. P. W. Abbott, Vice-President, in the chair. Mr. H. Foster Newey, of Hampton-in-Arden, was elected a member of the Society. Mr. R. C. Bradley said that he had learnt that a specimen of *Vanessa antiopa* was taken in Sutton Park some years ago by Mr. Titley. Mr. G. T. Bethune-Baker said that his father saw one at Moseley ten or twelve years ago; and Mr. Wainwright said one was seen in Wyre Forest by the Rev. R. R. Rodgers about the same time. Exhibits:—By Mr. P. W. Abbott, a living larva of *Agrotis ashworthii* taken at Llangollen the previous day. By Mr. W. Harrison, *Tæniocampa gracilis* from Arley, and a pupa of *Acherontia atropos* from Chalcot. By G. W. Wynn, *Orthosia suspecta* from Northfield, &c. By Mr. Petley, pupæ of *Brephos parthenias*, and the pupa-cases showing manner of pupation; they had bored deeply into bark and cork supplied to them, and pupated inside. By Mr. J. T. Fountain, larvæ of *Arctia villica* from Dawlish. By Mr. A. H. Martineau, a piece of wood from the stump of an old tulip tree at Middleton Hall,—it was very much perforated by a large colony of *Crabro interruptus*, usually a rare insect; also male and female specimens of the perfect insects, cells, and parasites. By Mr. C. A. E. Rodgers, a nice variable series of *Tæniocampa munda* from Malvern; one specimen had a broad median band and very little trace of any of the usual markings. Also varieties of *T. instabilis*, one closely approaching *T. stabilis* in colour and markings, the other resembling *T. populeti*, especially in the mousey colour of the thorax. By Mr. R. C. Bradley, some very beautiful photographs of the wings of insects, chiefly Tipulidæ, made by Mr. C. J. Bignell, and they were much admired for their definition and exactness. By Mr. Wainwright, *Xylocampa lithorhiza* from Knowle, &c. By Mr. H. Foster Newey, another lot of drawings of larvæ and pupæ in black and white, intended to illustrate a work on these stages of British Lepidoptera to supplement Newman's book. They were drawn to a uniform scale of four diameters, and were wonderfully distinct.

May 18*th*. — Mr. P. W. Abbott, Vice-President, in the chair. Exhibits:—By Mr. R. C. Bradley, a few ichneumons, *Anomalum bellicosum* from the New Forest, and a pair of *Banchus pictus* from Colwich. By Mr. P. W. Abbott, a number of insects taken on the sallows at Wyre Forest last Easter. He said that the sallows were more covered by moths than he had ever seen them before, *Tæniocampa miniosa* and *Oporina croceago* were both common, and all the usual species were abundant. He also had three *Tæniocampa opima*, not hitherto recorded locally; a *Lobophora lobulata* had also been attracted. By Mr. Wainwright, a boxful of Aculeates, including amongst others *Nomada bifida* from Colwich. Mr. Martineau said that Andrenidæ had been more than usually abundant this spring where he had observed them. By Mr. J. W. Smallwood, a series of *Amphidasys betularia* bred from one black and one normal insect (sexes not recorded); in the series were eight females of which six were black, and seven males of which one only was black. Mr. Wainwright said that all the black ones he had taken were females, and he believed that the variety, though not peculiar to that sex, yet had its origin in the female, and the female had the greater tendency to vary in that direction. Mr. H. Foster Newey said that he had bred a series from two black parents, and everyone came black, male and female alike. Mr. P. W. Abbott asked for the experience of members with regard to *Tephrosia crepuscularia;* he had just been taking light and dark ones intermingled, and also intermediate ones, being dark splashed with white, and he thought they were all one species.—Colbran J. Wainwright, *Hon. Sec.*

Cambridge Entomological and Natural History Society.—A meeting of the Society was held at the rooms of the Hon. Librarian on May 15th, the President in the chair. Mr. Rickard exhibited a case of beetles collected by himself at the Cape, including the rare genus *Ischnostoma*. Mr. Fleet, specimens found at Cambridge of the larvæ of the new British moth *Plusia moneta;* the young larva is very different in form and habit from the adult, and lives in a bunch of terminal leaves fastened together of monkshood. The President remarked on a work just published in Germany by Dr. Standfuss. This gentleman has made experiments in crossing species and varieties of Lepidoptera, and some of his results are certainly of interest.

Among other results he finds that hybridisation between closely-allied species produces a remarkable amount of hermaphrodite progeny. The President also exhibited one of the basket-worms, discussed at the last meeting; the specimen was extracted from its basket, and showed great differences when compared with ordinary caterpillars. He also showed another very exceptional larva from Madagascar, which he believed to be one of the "slug-worms" of North American naturalists. He then read a paper upon the "Destruction of Forests and its Results." He said that much wanton destruction of natural conditions occurs in all parts of the world, which in the long run impoverishes humanity. In connection with this the Californian Academy of Sciences has recently drawn up a report for presentation to the Congress of the United States protesting against such reduction of forest preserves, "it being a trespass of an inheritance which should by every legitimate means be preserved by this generation for those who are to come after." It has been conclusively proven that the terrible droughts, floods, and famines in Southern Russia are directly caused by the destruction of timber. It is also a well-established fact that the droughts and failures of crops in a large area of France are due to change in climate caused by the destruction of forests since the Revolution. In Britain this does not interest us so immediately, as we have a sufficient and moderate rainfall without forests, but in our Colonies it is not so. He had information that much unnecessary destruction occurred; and that in New Zealand much loss had recently been caused by drought. The preservation and management of forests ought to be considered one of the most important duties of Colonial Governments. From a naturalist's point of view it was sad to think that this destruction of forests involved the extermination of many of the animals of the world without our having acquired any knowledge about them, and in many cases without our having even seen them. —C. J. Wilkinson, *Hon. Sec.*

RECENT LITERATURE.

Our Country's Butterflies and Moths, and how to know them. A Guide to the Lepidoptera of Great Britain. By W. J. Gordon. With a thousand examples in colour by H. Lynn, and many original diagrams. Crown 8vo, pp. viii, 150; plates 32. London: Day & Son; and Simpkin, Marshall, Hamilton, Kent & Co. 1896.

As an aid to the identification of the species of Lepidoptera occurring in this country, especially as regards the Macro division, this marvellously cheap little book should be of assistance to the beginner. A large number of the figures are really very good, but it must be added that there are several which are simply grotesque caricatures of the species they are supposed to represent. Chapters I. and II. are respectively alphabetical lists of the popular and the scientific names of the species, and also serve as an index to the plates; but to these latter Chapter III. appears to be the systematic key. The remarks under the head "Sortation," although somewhat sketchy, are not uninteresting; but we think that the "keys by which the groups are sorted into families, the families into genera, and the genera into species," hardly promise to be of much service in the direction indicated.

The Hymenoptera-Aculeata of the British Islands. By Edward Saunders, F.L.S. Demy 8vo, pp. viii, 391; plain plates 3. London: L. Reeve & Co. 1896.

Possibly one reason why bees, wasps, and ants have not, so far, attracted the serious attention of those who are interested in the entomological fauna of our country is that there was no really up-to-date text-book on Hymenoptera-Aculeata available. With the advent of the important work now before us there is little doubt that our native species will be more closely studied, and interest in them be largely developed. The author deals with 374 indigenous species of Aculeates, and these are placed in four sections as follows:—Heterogyna (ants), 20; Fossores (sand wasps), 127; Diploptera (true wasps), 23; Anthophila (bees), 204. In the Introduction, which treats at some length of the anatomy of Hymenoptera, there are some useful hints on collecting and preparing specimens.

We have also received the following:—

'The Crambidæ of North America. By C. H. Fernald, A.M., Ph. D. 8vo, 93 pp., 10 plates. Massachusetts Agricultural College. 1896.'

'Report of the Entomological Department of the New Jersey Agricultural College Experiment Station. By John B. Smith, Sc.D. For the year 1895. Trenton, N.J. 162 pp. The John L. Murphy Publishing Company. 1896.'

'The Honey Bee: a Manual of Instruction in Apiculture. By Frank Benton, M.S. 118 pp., 12 plates, and many illustrations in text. Washington: Government Printing Office.' (Bulletin No. 1, new series.)

'United States Department of Agriculture. Division of Entomology:—The San Jose Scale, its occurrences in the United States, with a full account of its Life-history, and the Remedies to be used against it. By L. O. Howard & C. L. Marlatt. 80 pp. Washington: Government Printing Office. 1896.' (Bulletin No. 3, new series.)

'The Grass and Grain Joint-Worm Flies and their Allies: a consideration of some North American Phytophagic Eurytominæ. By L. O. Howard, Entomologist. 24 pp. Washington: Printing Office. 1896.' (Technical Series, No. 2.)

'Cornell University Agricultural Experiment Station, Ithaca, N.Y. Entomological Division:—Climbing Cutworms in Western New York. By M. V. Slingerland. The University, Ithaca, N.Y. 1875.' (Bulletin, 104). Also by the same author:—'Wireworms and Bud Moth' (Bulletin, 107); and 'The Pear Psylla and the New York Plum Scale' (Bulletin, 108).

'The Mediterranean Flour Moth (*Ephestia kuehniella*, Zell.) in Europe and America. By W. G. Johnson, A.M., Assistant Entomologist. Appendix to the Nineteenth Report of the State Entomologist of Illinois. 65 pp. Springfield, Ill. Ed. F. Hartman. 1896.'

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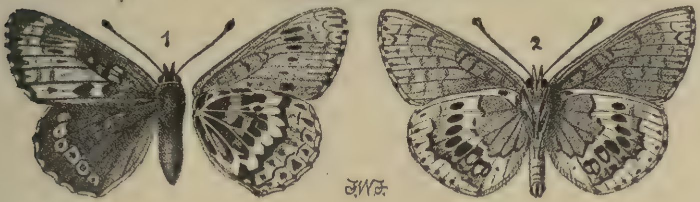
MELITÆA CINXIA, ABERRATIONS.



Although *M. cinxia* is subject to considerable variation in the pattern of the under surface, which seldom agrees exactly in any two specimens, such striking forms as those represented in the above figures are of very exceptional occurrence.

Fig. 1 is a remarkably beautiful female: the upper surface of the primaries has all but lost the usual transverse bands crossing the apical half, while the basal half is heavily clouded; the secondaries are rich fuscous, showing only the submarginal fulvous rings and two small fulvous spots in the discal cell; the under surface of the secondaries has all the usual black markings so greatly intensified that many of the normally light basal markings are entirely obliterated, giving the specimen a very rich appearance; crossing the primaries are series of elongated marks.

Fig. 2, a male, is almost normal on the upper surface, but the pattern of the under surface of the secondaries is very aberrant, the fulvous basal area being almost devoid of markings, the median light band is heavily blotched with black, and the fulvous band strongly outlined with black. Out of some hundreds of specimens I have bred I obtained a somewhat similar male, having the median light band heavily marked with broad black blotches.

Both specimens figured above were captured at Ventnor some years ago, and are now in the rich collection of Mr. A. B. Farn, to whom I am indebted for the loan of them for figuring.

F. W. Frohawk.

July, 1896.

AMONG THE SPRING BUTTERFLIES IN THE ARDENNES.

By W. Harcourt-Bath.

Last May I took a flying trip to the Forest of Ardennes in the Belgian provinces of Namur and Luxemburg. Leaving London on Saturday morning, May 23rd, I arrived the same night at Brussels, where I had to break my journey. The next day, however, at about 2 p.m., found me at my first destination, the picturesque and romantic little town of Dinant-sur-Meuse. Being cold and dull when I arrived, I determined to postpone entomological operations until the following day. The whole of Monday I spent in traversing the high, breezy uplands called the "Famenne"—a distance of twenty miles—to Rochefort, from whence in the evening I took train to Poix, situated in the sheltered valley of the Lomme. The next four days were occupied in exploring the Valley of Poix as far as St. Hubert, and the thickly-wooded country around Grupont. The weather was tolerably favourable for day work, to which I confined myself. The nights and early mornings were exceedingly chilly, but the days were fine, although there was upon the whole perhaps more cloud than sunshine. I found vegetation rather backward, which can be readily understood when I remark that the mean average elevation above the sea-level of the region under consideration is between 1000 and 1500 feet. At St. Hubert (which the Baron de Selys informs me is a good locality for the Lycænidæ) the oaks were only just in bud, while the hawthorn was not yet in blossom; and in all the higher meadows the wild daffodil (*Narcissus pseudo-narcissus*) was still in full flower, although it had disappeared from sight in the midland counties of England for at least five or six weeks. As a consequence, I did not find butterflies plentiful, except in the most sheltered situations at the lower elevations. If I had postponed my visit until a week or a fortnight later, I should have procured a longer series of many species which were only just commencing to make their appearance. Orthoptera were well in evidence, the field-cricket (*Acheta campestris*) occurring in great numbers in many localities, in addition to several species of field-grasshoppers in the imago state, although so early in the season.

The woods in the district visited are mostly composed of beech and oak, the former tree being at its best, and looking beautiful indeed, with its cheerful, light green foliage. There are also numerous coppices of birch and hazel, in addition to artificial plantations of spruce-fir and other conifers. The undergrowth consists chiefly of hazel and bilberry, the latter being found principally in the beech woods. Sloe was seen plentifully in several localities, being frequently adorned with nests of the lackey-moth (*Bombyx neustria*). The hill-sides around Grupont presented a gorgeous appearance with the golden flowers of the broom, which was in full bloom, and entirely takes the place of the gorse in our own country, the latter shrub being unable to withstand the cold winter climate of the Ardennes. Heather of several species clothed the more sandy uplands and waste places.

The principal products of agriculture appear to be corn of different kinds, sainfoin, and Dutch clover. Apple trees were the fruit trees mostly in evidence in the orchards. In all the lower situations, beautiful, rich natural meadows abound, wherein flourished a great profusion of flowers, affording good collecting-grounds for the entomologist. These meadows are irrigated in a similar way to what they are in the Alps, namely, by means of trenches, along which the water of streams is carried from higher levels and made to overflow.

For the edification of those who may be fond of bigger game than butterflies, I will mention that wild boars are exceedingly numerous in the forest, and commit great depredations upon farms in the vicinity. Wolves are still found, although in gradually decreasing numbers each year. Of bears I could not obtain any information; but they probably still linger in some of the more unfrequented parts of this wild domain, as they were certainly known to do thirty years ago.

I will now supply a summary of the number of species of butterflies which I obtained each day, with particulars of the weather experienced:—

May 24th,	8	species.	Very dull and cold.
,, 25th,	24	,,	Fine most of the day, with a very cold wind.
,, 26th,	21	,,	Fine, with a cold wind.
,, 27th,	21	,,	Fine in the morning, cloudy in the afternoon; a heavy thunderstorm occurred during the night.
,, 28th,	22	,,	Dull all day to 4 p.m.
,, 29th,	28	,,	Dull all morning, fine in the afternoon.

I may here say, for the sake of comparison, that the largest number of butterflies which I have met with on the wing in the month of May in the South of England is twenty.

The number of species of butterflies which I encountered in the Ardennes during my brief visit was thirty-four, of which thirty-three were seen on the wing, one being in the larva state only.

The following is a list of the species encountered, with localities, &c.:—

PAPILIONIDÆ (2 species).

Papilio podalirius.—Ten specimens, mostly in good condition; one of them, a female, being a magnificent large, rich-coloured example. Celles, Ciergnon, Grupont. *P. machaon.*—Three specimens, only one in good condition. Valley of Poix, Grupont.

PIERIDÆ (6 species).

Pieris brassicæ.—Only just commencing to appear. *P. rapæ.*—Very plentiful. *P. napi.*—Very plentiful.

Euchloë cardamines.—Abundant.

Colias hyale.—Four specimens. Celles, Grupont.

Gonepteryx rhamni.—Hybernated specimens; very numerous.

LYCÆNIDÆ (8 species).

Chrysophanus dorilis.—Abundant. Ciergnon, Valley of Poix, St. Hubert, Grupont. *C. phlæas.*—Several specimens.

Thecla rubi.—Several specimens from different localities.

Lycæna astrarche.—Several specimens. Grupont. *L. icarus.*—Numerous. *L. argiolus.*—Scarce. Celles, Grupont. The pabulum, I think, must be sloe, as there is no holly whatever. *L. minima.*—Several specimens in different localities. *L. semiargus.*—Grupont. A small series.

ERYCINIDÆ (1 species).

Nemeobius lucina.—Two specimens. Grupont.

NYMPHALIDÆ (9 species).

Vanessa urticæ.—Hybernated examples numerous; larvæ seen in all stages of growth on nettles. *V. io.*—Several hybernated examples seen. *V. antiopa.*—One hybernated specimen at Poix. *V. atalanta.*—Three larvæ on nettles.

Melitæa cinxia.—Several specimens. Grupont. *M. athalia.*—Several specimens. Grupont, Celles, Ciergnon, St. Hubert.

Argynnis selene.—Several specimens. Grupont. *A. euphrosyne.*—Very plentiful. *A. dia.*—Two specimens. Valley of Poix, Grupont.

SATYRIDÆ (5 species).

Erebia medusa.—Several specimens. Celles, St. Hubert, Grupont.

Pararge mæra.—One specimen. Ciergnon. *P. megæra.*—Abundant. *P. egeria.*—Several specimens.

Cœnonympha pamphilus.—Plentiful.

Hesperidæ (3 species).

Spilothyrus alceæ.—Several specimens. Celles, Ciergnon, Valley of Poix, St. Hubert, Grupont.

Syrichthus malvæ.—Very abundant. Ab. *lavateræ.*—One specimen. St. Hubert.

Nisoniades tages.—Very abundant.

FUNGI PARASITIC ON BUTTERFLIES.

By J. C. Rickard.

In the July number of the 'Entomologist' (*ante*, p. 215) are two paragraphs referring to a paper on the above subject (*ante*, p. 170). The first is by Dr. Sharp, who correctly states that he pointed out at the meeting at which the paper was read that the objects in question are known as androconia, &c. He also exhibited some numbers of a German magazine in which several of them are figured. The other paragraph is by Mr. S. H. Scudder, who states that if I "had ever studied the androconia of butterflies, he would have at once understood why his supposed 'fungi' were confined to the male sex of the insects examined." He then recommends me to examine Wonfor's articles and illustrations bearing on this subject. I am obliged to Mr. Scudder for this reference.

Neither of these gentlemen seems to have personally investigated the subject, both having referred me to the works of other entomologists. As their remarks throw considerable doubt on my statement as to the fungoid nature of these organisms, I would like to give some reasons for so regarding them.

On the present occasion I will confine my remarks to the parasites of the Pierids mentioned in my paper, as of these I can speak with more confidence than I could of those found on Satyrids and Lycænids. I assert without the least hesitation that all the figures of the so-called androconia of the Pierids that I have seen or heard of represent them upside down. To prove this, stain the wing of *Pieris brassicæ* and transfer the scales (and fungi), while still wet, to a slip of glass. If these are microscopically examined *through* the glass slip, it will be seen that the apex or free extremity of the fungus is that part which has hitherto been regarded as the basal portion. I believe this error has mainly arisen from the fact that the scales and fungi point in opposite directions: if the fingers of one hand are locked in those of the other, the one set of fingers will represent the scales, and the other set the fungi.

If these objects are modified hairs or scales, there is every reason to believe that their surfaces would exhibit striations. Of these there are no signs; the only things at all resembling striæ are the wrinkles seen on the peridium of the fungus of *P. rapæ* and *P. napi;* moreover the stem separates from the peridium at a certain definite spot, where there exists a sort of "hilum." If the fungi were connected with the butterfly's wing by these bulb-like bodies, a large proportion of them would fall off, and the butterfly would lose whatever benefit these so-called androconia afforded, the bulbs remaining attached to the wings as useless incumbrances. On the other hand, assuming these bulbs to be sporocarps of a fungus, what more natural than that they should fall off after they had completed their work of maturing and shedding their spores?

Again, if these organisms are only modified hairs or scales, they would be formed of chitinous material. The fungus of *P. brassicæ* generally has the stem bent to a considerable angle with the body (peridium), but on adding a drop of water the stem straightens out. I submit that if the material was chitine it would not exhibit this sensitiveness to moisture. But this is not all; the sporocarps from dry examples of *P. rapæ* and *P. napi* have a "withered" appearance, the addition of a little water causes them to swell, the wrinkles disappear, and the black spot so conspicuous on the apex of the fungus of *P. agathina* (p. 171) makes its appearance. I repeat that the withering and subsequent "plumping" out on the addition of water indicates a vegetable and not a chitinous substance.

But if up to this point I had felt any doubt as to their character, all doubts would have been entirely dispelled on seeing the wonderful parasite of *Pieris agathina* (see p. 171). Here, again, the sensitiveness to moisture is noticeable. When they are first removed from the wing about one-fourth the length of the basal portion is bent so as to form an obtuse angle with the axis of the body, giving the fungus an unsymmetrical appearance; but after keeping them between glass slips for a day or two, the dampness of the room causes them to straighten out and assume a perfectly symmetrical form. It was the observation of this fact that induced me to add the note on p. 171 relative to the probable origin of the square form of this fungus. A comparison of the "glassy" sporocarp of this fungus with that of the fungus of *P. rapæ* (after damping the latter) will convince anyone of their identity of form and function; and as the parasites of all the Pierids mentioned are closely allied, the demonstration of the apex of one form settles it for all the others. It should be borne in mind that what we see on the butterfly's wing is merely the fructification of a plant whose vegetative organs (mycelium, &c.) are enclosed within its substance. I may also state that the spores of the *brassicæ* fungus germinate freely between slips of glass.

The circumstance of their occurring only on male butterflies is a singular fact; but I think parallel cases, perhaps equally inexplicable, could be found as pathological occurrences.

It is obvious that if these objects are really fungi, there is no reason why they should not function as scent-producers—which I believe is the office assigned to androconia in general—and in this manner render a service to their host, and supply an additional reason for the belief in that particular form of parasitism known as symbiosis.

Will Mr. Scudder (or some other American entomologist) kindly inform us whether the "fungi" or "androconia" of the yellow variety of *Pieris rapæ* are in any way modified as compared with those of the ordinary white form?

3, Halifax Road, Cambridge.

UNIFORMITY IN PINNING LEPIDOPTERA.

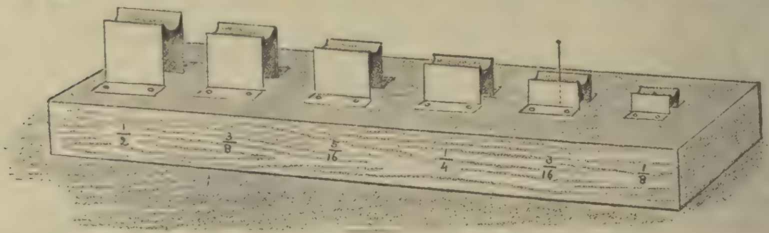
By N. F. Searancke, L.R.C.P.

In the recent correspondence on setting and preserving moths (Entom. xxviii. 303, 332; and xxix. 83, 125), I have been disappointed at seeing two points which deserve more serious consideration only mentioned casually, *i. e.* the necessity of having a standard of height of setting, and a way to procure absolute evenness of height. Too much is left to guess-work and individual fancy on these two points.

Every collector whose series are filled up from different sources must, after a time, come to regard his collection with a feeling akin to dissatisfaction. Each individual moth may be without reproach as regards setting, &c., but the *tout ensemble* leaves much to be desired, owing to the various heights of setting fancied by different collectors. Some have the wings touching the paper of the drawer, some are half-way up, and others right up at the top of the pin, giving the whole a ragged and untidy appearance. The text-books are not very clear on the subject; and as some collectors will prefer one style and some another, if much exchanging is done the above unsatisfactory state of affairs is bound to happen sooner or later. Discrepancy in height cannot always be overcome by bringing the higher ones down to the level of the lower; nor is the necessary force required to stick them deeply in the cork unattended with risk to pin and moth.

Could not some leading entomologist lay down a standard of height at which the various-sized insects ought to be set, either in parts of an inch or in millimetres? It is no use saying, "Stick the pin through the moth till there is as much underneath as above," as all collectors do not use the same sized pins for the same insects. The advice, too, to pin them so that when set and pinned in the drawer the wings should just clear the bottom, leaves too much to guess-work, and often results in leaving too much or too little pin underneath.

To procure absolute evenness in pinning, I have made a "contrivance," which I hope will be found of use. At any rate, it has the merit of being simple, and easily made by any collector in about an hour, as it only requires the simplest mechanical skill for its construction. It consists of a series of six little "rests" (for want of a better term) of six different heights. These are made from strips of tin varying in width from $\frac{3}{4}$ inch for the highest "rest" to $\frac{1}{4}$ inch for the lowest. These strips are bent into the shape something like the letter **M.** With a fine taper-point punch, a hole is punched through the middle of the central part, and two more through each of the flanges, the latter being to tack the "rest" on to a wooden stand; the central hole is easiest made before bending the strip into the desired shape. The heights of the "rests" (which correspond to the length of pin which will be underneath the moth when pinned) I have made as follows:—$\frac{1}{2}$, $\frac{3}{8}$, $\frac{5}{16}$, $\frac{1}{4}$, $\frac{3}{16}$, and $\frac{1}{8}$ of an inch. This gives a good range of height, $\frac{1}{2}$ inch being for the largest moths—*atropos*, &c.; $\frac{1}{8}$ inch for the smallest Geometers —pugs, &c. The six "rests" are tacked side by side on a wooden stand, 6 inches long by $1\frac{1}{2}$ half inch wide, and $\frac{1}{2}$ an inch thick. The *modus operandi* is as follows:—Start to pin the moth in the usual way (how I wish a "contrivance" could be made to get the pin in straight). When the pin appears underneath the body of the moth, place the latter on the "rest" appropriate to its size, and push the pin through the hole in the centre of the "rest," till it is stopped by the stand underneath. In this way, no matter what sized pin is used, every moth of the same size must have, to a hair's-breadth, the same length of pin underneath. The difference in a drawerful of moths set in this manner and a drawerful made up with various settings from various sources, is very great; the perfect evenness and regularity of the former contrasting favourably with the "scratch-lot" appearance of the latter.



If anyone who reads this, and wishing to make a "pinner" for himself, cannot make out how the thing is made from the illustration and the foregoing description, which latter, I fear, rather lacks lucidity, I should be most happy, on hearing from him, to send one of the "rests" as a pattern. It is much more easily made than described. The best way to get the correct measurements is to mark them off with a rule on the tin strip before bending into required shape; with the pliers, bending can then be performed with exactness.

Mitcheldean: May 11th, 1896.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 214.)

Anarta myrtilli, *L.*—Very common in all moors and bogs. The colour varies from a bright brownish red (not so brick-red as in some English specimens I have seen) to a dark reddish black. In the bright specimens the white strigæ, &c., are well marked, but in the dark forms (from Markree Castle, Sligo, Toberdaly, King's Co., Belleisle on L. Erne, and Altadiawan, Co. Tyrone) they are partially and sometimes almost wholly obsolete, especially on the basal area (var. *albirena*, Haw.).

Heliaca tenebrata, *Scop.*—Rarely met with. Markree Castle (*Miss Cooper*); Killarney (*B.*), and Sneem, Co. Kerry (*R.*).

Heliothis scutosa, *Schiff.*—One specimen was taken Sept. 19th, 1878, by Mr. David C. Campbell, of Ballynagarde House, near Derry, and identified by me. It was netted flying to the flowers of ragweed on the shore of L. Swilly near Buncrana. In view of the doubts raised some time since as to the *bonâ fide* occurrence of this rare insect in England, which were, I think, satisfactorily met by confirmatory evidence of capture, this undoubted record of a capture in Ireland is of the highest interest. Mr. Campbell and myself have subsequently visited the locality in vain for other specimens.

Heliothis peltigera, *Schiff.*—I have met with a few specimens only, but it would not be safe to assume this as a criterion of scarcity, as very few southern localities have been tested, and those for the most part only during a hasty visit when yachting. Greystones, Co. Wicklow, one; Castlehaven and Crookhaven, Co. Cork, a few.

Heliothis armigera, *Hb.*—Howth (*Holt*); Glengariff, Co. Kerry (*Meek*).

Chariclea umbra, *Hufn.*—Local and scarce. The specimens I have taken or examined are of the rich ruddy form. Birchall records, "Howth and Co. Galway," where one has been taken since at Clonbrock (*R. E. D.*); Greystones, Co. Wicklow, scarce; near Kenmare, Co. Kerry, a few; Cappagh, Co. Waterford, one (*Miss V.*); Castle Bellingham, Co. Louth, one (*Thornhill*); Armagh; and Sligo, one (*McC.*).

Erastria fasciana, *L.*—A constant species, but variable in the marking of the reniform, which is sometimes filled in with white, but sometimes scarcely indicated by an outline. Apparently confined to Kerry, where it is in profusion near Killarney, Glenflesk, above Kenmare, near Headford, and about Loughs Cloonee and Inchiquin, &c.

Bankia argentula, *Hb.*—This species, when fresh, presents no notable variation. The greenish colour is rather evanescent. Very abundant in spots among the Killarney bogs, as at Dinas and Garrymeen Bog, near Lord Brandon's cottage, and the lower slopes of Mangerton. Widely spread through Kerry, in similar localities as the last, but in more restricted areas, though stray specimens are met with throughout the neighbouring districts. The Hon. R. E. Dillon has discovered it also in Galway, at Clonbrock, and Mount Bellew.

Hydrelia uncula, *Clerck.*—Locally distributed in many Irish counties, and not, as in the preceding two species, confined to the south and west. There is a slight variation in the breadth of the "unca" mark; and in fresh specimens a pretty rosy tinge suffuses the fore wings, but is unfortunately evanescent. Abundant at Killarney and Kenmare, and in the same Kerry localities as the preceding. Occurs in Westmeath locally, at Cromlyn (*Mrs. B.*), and Killynon (*Miss R.*); Newcastle fens, Co. Wicklow, not rare; Mount Talbot and Clonbrock (*R. E. D.*), and near Galway (*A.*). Common near Castle Bellingham, Co. Louth, where Mr. Thornhill met with a second brood on Aug. 1st, 1894, which was notable for a very hot summer.

Phytometra viridaria, *Clerck.* — Exhibits the usual wide range of colour variation in Ireland, where it is common and widely distributed.

Euclidia mi, *Clerck.*—Variable both in the pale design and in colour. The pale lines and spots are sometimes yellowish, but generally whitish, and the ground colour is sometimes very dark fuscous-grey. Very widely distributed, but somewhat local, and often numerous.

Euclidia glyphica, *L.*—Curiousl y enough, I have rarelymet with this generally common species in Ireland, except in Galway. It is locally abundant, but seems not generally distributed. I have no records from the north. In Galway it is pretty widely distributed, and probably will be found on the dry limestone pastures of Clare. Near Clonbrock, and Castle Taylor, Merlin Park, &c., abundant. Also at Tullamore, King's Co.; at Cromlyn, Co. Westmeath (*Mrs. B.*), and Clondalkin, Co. Dublin (*Gr.*).

OPHIODES LUNARIS, *Schiff.*—Noticed as follows in Birchall's 'Catalogue':—"Two specimens captured at Killarney by the late P. Bouchard in 1864." But in the 'Supplementary Catalogue' of 1873 he includes *N. bicolora* and this species in the list of errata. There is no doubt in my mind of the authenticity of Bouchard's captures at Cromaglaun Glen. His character, according to the late Frederick Bond and other contemporaries, was above suspicion; and the subsequent captures of the former species has dispelled all doubts as to its being indigenous in Kerry. The Irish climate being in no way unsuitable to the latter insect, I have no hesitation in reinstating the record in the Irish list, more especially as I have been shown a specimen of the same by Mr. Dillon, taken by Lord Clonbrock's gamekeeper in his demesne in 1894.

CATOCALA FRAXINI, *L.*—One was captured at Kingstown in 1845 by the Rev. Joseph Greene, and is still in his cabinet at Clifton.

CATOCALA NUPTA, *L.*—Curiously enough this handsome and conspicuous moth has only been recorded as occurring in Ireland as follows. The late Dr. Robert Ball, sometime Curator of the Trinity College Natural History Museum, reported its capture by him to Mr. Birchall, but omitted to state the locality. Mr. Cuthbert, of Blackrock, also informs me that he saw a specimen on a tree at Blackhall, Co. Louth, a few years since, but refrained from taking it, as he only collected Coleoptera. There can be small possibility of an error of identification in the case of so large and conspicuous a moth.

(To be continued.)

SILK-PRODUCING LEPIDOPTERA.

By ALFRED WAILLY.
(Membre Lauréat de la Société Nationale d'Acclimatation de France).

(Continued from p. 210.)

ANTHERÆA ROYLEI, Moore (Himalayan oak silkworm), a species closely allied to *A. pernyi*. The moths are of a lighter shade of colour than those of *pernyi*, and have a greenish tint. The principal difference between the two species is in the cocoon; that of *roylei* is white and covered by an irregular and hard envelope; the cocoon of *pernyi*, on the contrary, is of a light brown or buff colour, and it has no envelope. Moths emerging from cocoons imported from India hatch for the most part in May or June, and some in the beginning of July. *Pernyi* and *roylei* moths pair together as if they were one and the same species; and it is the same with all closely allied species. The eggs are apparently identical, and so are the larvæ. The hatching of the eggs takes place after the same lapse of time, and the duration of the rearing is the same.

The crossing of the *roylei* with *pernyi* produces the remarkable and robust hybrid which I obtained in 1881, susceptible of reproduction and forming an intermediate type between the two parent species *roylei* and *pernyi*. *A. roylei* is found at Simla, Mussoori, Almorah, Darjeeling, and in Assam.

With respect to the *roylei-pernyi* hybrid I obtained in 1881, notices will be found in my reports on silk-producers for 1881 and 1882, which appeared in the 'Journal of the Society of Arts,' London. Specimens of moths and cocoons were exhibited and submitted to the Council of the Society of Arts on June 20th, 1882, after which an article on the subject was inserted in the Journal on Sept. 8th, by the editor, who had come previously, on my invitation, to examine the worms growing on the small oak trees in my garden in July. I very much regret, however, to have to record the extinction of my hybrid, in consequence of very bad weather, the destruction of worms by sparrows, and other causes, three years or more after the species had been obtained by me; but it never showed any sign of degeneracy. The stock of hybrid cocoons which had been obtained was by far too small to ensure a successful and lasting reproduction of this new species.

I shall now give the description of the hybrid by Mr. W. F. Kirby, as read by him at the meeting of the Entomological Society of London, on May 3rd, 1882:—

"*Notes on a hybrid between Antheræa pernyi*, Guér., *and A. roylei*, Moore.—M. Wailly, the well-known rearer of silkworm moths, has succeeded in obtaining hybrids between *Antheræa pernyi* and *A. roylei*, and has requested me to describe one of the moths. *A. pernyi* is the well-known oak-feeding silkworm of North China, and *A. roylei* is a North Indian species, also an oak-feeder. Hence they are not species occurring in the same locality in a state of nature. M. Wailly states, in a paper lately published in the 'Journal of the Society of Arts,' that the male *pernyi* paired readily with the female *roylei*, and that the hybrid larvæ (which he describes) proved much more easy to rear than those of *roylei*, with which he had but little success. The hybrid before me expands just six inches across the wings, which is about the size of large female examples of the two parent species. It is of a greenish buff colour, nearly as in the female of *roylei*, but much clearer, and with a distinct tawny shade, especially within the common band; the body and base of the wings are also suffused with a distinct vinous shade more resembling *pernyi* then *roylei;* the shape of the wings also agrees better with *A. pernyi.* On the other hand, the eyes resemble those of *roylei*, but are considerably larger, the pupil especially being as large as in *pernyi*, but the projection of the black outer rim, so conspicuous in *pernyi*, is scarcely indicated. The other markings of the wings are well defined, and resemble those of *A. roylei.* On the under surface the insect agrees in colour and markings with typical *roylei*, but the basal band is less distinct and perhaps less waved, and the submarginal spots, dusted with white and pink, are larger and more distinct. Just inside there is a very faint dark stripe, more distinct on the right wing. In *roylei* this is still more indistinct, whereas in *pernyi* it is well marked, but closer to the spots. The antennæ and body of the hybrid are more like *A. pernyi* than *A. roylei.* The cocoon is fully as large as that of *roylei*, but instead of there being a considerable space between the outer and inner cocoon, there is scarcely any interval between them. *A. pernyi* has a similar but much smaller cocoon, and hence it would appear that that of the hybrid would be of greater commercial value than either.—W. F. Kirby."

The following letter and description I received on Dec. 13th, 1882, from Mr. F. Moore, Curator of the Bethnal Green Museum, and formerly of the India Museum:—

"Dear Sir,—Enclosed is a description of the imagos of your hybrid *roylei-pernyi*, which I promised to send you. I was much interested on my visit to you in August, and was astonished to see with what facility the larvæ of the various silk-producers can be reared in the open air. Your larvæ of *cecropia*, *luna*, *selene*, *roylei*, and the hybrid *roylei-pernyi*, all appeared in a most healthy condition. They could not have been better had they been living in their native country.

"*Description of the hybrid, roylei-pernyi.*—The imago, in point of coloration, is intermediate between the two species. Both sexes of the hybrid show the mealy olivaceous colour of the pure *roylei*, dominated by a tinge of the ochraceous colours of *pernyi;* the ochraceous tinge, however, is brightest across the discal area of both wings within the transverse band, and more especially so in the female. The bands on both wings are more strongly developed than in *roylei*, and more so even than in *pernyi;* the ocelli in both sexes are larger than in either *roylei* or *pernyi*, the talcose central spot being much larger than in *roylei*, but about the same size as in *pernyi.* The ocellus on the hind wing differs from that of *roylei*, in having the upper curve somewhat extended upwards, thus giving it a slightly lobate form, as in some female specimens of *pernyi.* Both sexes of the hybrid are comparatively larger than the general size of *roylei*, and are much larger than *pernyi.*—F. Moore."

ANTHERÆA MYLITTA (*Attacus mylitta*, Fabricius; *Attacus paphia*, Linné). This large and valuable silkworm, known also under the name of "tussah" or "tusser," is spread all over India and Ceylon. It is cultivated in Bengal, Assam, &c. It has a very extensive range, and may very likely be found in Burmah, Siam, Cochin-China, the Malay Peninsula, and the islands of the Indian Ocean.

The cocoons of the different races of *Antheræa mylitta* vary considerably in size, the largest coming from the Himalayas and other northern parts of India. The moths also vary considerably in size and colour. The *mylitta* cocoon is perfect in shape; it is smooth and without any floss; it is suspended to a small branch of the tree or shrub on which the larva has fed, by a strong silken cord, forming a ring around it.

In Europe this species has been bred on oak and hornbeam (*Carpinus betulus*). In India it lives on many trees and shrubs; among others, on *Terminalia tomentosa*, *Ziziphus jujuba*, *Lagerstræmia indica*, *Ficus benjamina*, *Carissa enidia*, &c.; it is also said to have been found on wild plum. The moths from cocoons imported from North India generally begin to emerge from the end of June, but it is in July and August that they emerge in numbers; they then continue to emerge till about the end of October. Moths will even emerge in the winter if the weather is mild. The cocoons may hybernate twice and even three times. In northern countries *mylitta* cannot be reared in the open air, owing to the formation of the cocoon, and the hatching of the larvæ taking place too late in the season. In Spain, where I introduced it in 1884, Mr. Segin, British Vice-Consul in Mahon, Minorca, succeeded in rearing, on oak trees in the open air, worms obtained from a pairing which had taken place on July 31st. The eggs hatched ten days after they were laid, and the larvæ began to spin on Sept. 29th. Worms from two other pairings which had taken place, one on Aug. 13th, the other on the 14th, all died in the middle of November, in consequence of a sudden and complete change of temperature, just at the moment they were going to spin.

ANTHERÆA ASSAMA (*A. assamensis*, Helfer). With the exception of the Dehra Doon, where it lives on a tree bearing the name of "kirkee," this species is only found in Assam, where, in the Assamese language, it is called "muga," which means "amber," on account of the colour of the cocoon. *A. assamensis* is cultivated in Assam on a large scale, and its silk is highly valued. In certain parts of Assam five generations are obtained. The sum (*Machilus odoratissima*) is the favourite food of this species; reared on it the worm produces, it is said, the finest and best silk. In Lower Assam it is reared on the sualu (*Tetranthera monopetala*). The foliage of certain species of forest trees, such as dighlati (*T. glauca*), bamroti (*Symplocos grandiflora*), and patichanda (*Cinnamonum obtusifolium*), may also be used to feed the worms if the first two trees should be found wanting in the last stages.

During four consecutive years I received during the winter or in the spring large quantities of *A. assamensis* cocoons, but they never arrived in good condition. In 1889 over 400 were sent to me, all the moths having emerged during the voyage or died in the cocoon. Some of the moths had, however, emerged only a few days before the arrival of the boxes containing the cocoons, and this shows that it would be possible to receive the cocoons before the emergence of the moths, if they were sent in small boxes by sample post, going overland like the letters, instead of being sent by parcel post, which takes a fortnight longer.

To obviate this rapid emergence of the moths, my correspondent in Assam placed in the boxes *assamensis* larvæ which were just beginning to spin, thinking that by so doing about a week would be saved. The experiment was a complete failure, but it taught this lesson,—that larvæ cannot live, or change into pupæ that will live, when they are travelling; the shakings experienced by the larvæ when travelling prevent them from forming their cocoons properly, and also kill the larvæ or newly formed pupæ. Therefore I only found dead larvæ or dead pupæ in the cocoons.

ANTHERÆA FRITHII, Moore.—This is probably only a variety of *A. mylitta*. It is found in some parts of India, in Cochin-China, &c., and, according to Captain Hutton, at Darjeeling.

ANTHERÆA PERROTTETI, Guérin Méneville. Another race or variety of *A. mylitta*, discovered at Pondicherry by Mr. Perrottet.

ANTHERÆA HELFERI. Another species, the cocoon of which resembles that of *A. mylitta* (*Antheræa nebulosa*, Hutton). "A remarkable species, common in Central India, the silk of which can be compared to that of *A. mylitta*."—Capt. Hutton.

BOMBYX (*Theophila*) HUTTONI, Westwood. "A bivoltine species, living in the mountains on the wild mulberry tree, at Simla, Mussoorie, and Almorah. *B. huttoni* is a robust species, producing a fine whitish cocoon. Although the *huttoni* worm is too wild to be bred in captivity, it would be a useful species for rearing in the open air on the mulberry tree itself."—Capt. Hutton.

BOMBYX (*Theophila*) BENGALENSIS, Hutton. A polyvoltine species, resembling *B. huttoni*, but living in Bengal on *Artocarpus locucha*. "This species is smaller than the preceding one."—Capt. Hutton.

BOMBYX AFFINIS. Discovered in 1869, at Chota Nagpore, by M. Kingi; it lives on *Artocarpus locucha*, but Capt. Hutton reared it with the greatest success on branche of *Morus indica*.

(To be continued.)

NEW EXPERIMENTS ON THE SEASONAL DIMORPHISM OF LEPIDOPTERA.

By Dr. August Weismann.

(Translated from the German by W. E. Nicholson, F.E.S.)

(Concluded from p. 208.)

Furnished with this better information, let us turn to the observation of some other cases, which, I believe, we must consider as adaptive seasonal dimorphism.

Among these I reckon before all our Pieridæ, which are seasonally dimorphic, at least partially so. *Pieris napi*, the green-veined white, exhibits in its spring form the well-known broad blackish green powdering of the under side of the hind wings, which is obviously a protective colouring, and which, in fact, conceals the butterfly sitting asleep upon the leaves of plants just as well as the chequered green and white under side of the species of *Anthocharis*. But it is just this green protective colouring which is absent in the summer form, and the thought arises that the drier and less brilliantly green surroundings of the summer brood have made this alteration necessary. I well know that experienced entomologists, such as Seitz, have expressed the opinion that our whites enjoy immunity from birds, and would not be eaten by them. But in the first place the very accurate observations of Poulton and others are opposed to this view; and then with a butterfly asleep it is not a question of enemies among the birds, but of lizards, frogs, toads, and other enemies, whose importance in reference to butterfly-life is only very imperfectly understood. But this inadequate insight into the biology of the insects is just as true of the spring form, and with this the protective significance of the under side cannot be doubted. It is therefore certainly explained by the enemies of the butterfly at rest, whether we know them or not, and whether they still form a danger to the species or only did so in earlier times; as an old acquisition is only slowly lost, if it becomes unimportant.

Let us now see whether the results of the experiments agree with this view.

Besides my old experiments there are those of Merrifield on *Pieris napi*, and my own, which are here published, on *napi* and its var. *bryoniæ*. Our results appear to be contradictory on one important point, since Merrifield believes he has found that the critical time for the determining influence of temperature is the last days of the pupal period, while it is obvious from my new Experiments I. and II. that the time immediately after pupation is the critical one. The majority of the pupæ of the first experiment, which were subjected to the summer temperature at this time, produced the summer form, although cold may have acted upon them towards the end of the pupal period. On the other hand, in the second experiment pupæ of the same brood produced the winter form, when they were placed in the refrigerator immediately after pupation, and the result was not materially altered, if they were brought into the incubator three days before emergence.

I believe, however, that the contradiction between Merrifield's results and my own is only an apparent one, and that the reason is, that with *P. napi adaptive and direct seasonal dimorphism are mixed.* Theoretically this might be anticipated as not only possible, but probable. A species, which has adapted itself to the seasons of the year by a double protective colouring, can on this account be still directly alterable by heat or cold. And this appears to be the case with *P. napi.* Only the under side of the wing is really adaptive here, but differences between the winter and the summer form are also exhibited even on the upper side. The winter form possesses the black powdering of the bases of the wings, which is absent in the summer form; the winter form also exhibits a fine black powdering of the veins of the wings towards the margin of the wings, a character which is most strongly pronounced in the var. *bryoniæ.* But while the winter form has the apex of the fore wings only a dull grey, the summer form has here a more sharply defined and larger brownish black colouring.

A biological value can scarcely be attributed to these characters, and when it is seen that they run parallel to the action of a higher or a lower temperature on the pupæ, there is an inclination to regard them as the *direct* influence of the colour chemistry.

Should this view be correct, we must expect that circumstances might arise, which would result in a commingling of the characters of the winter form with those of the summer form; for example, winter form below and more or less summer form above. This would have to occur, if, for example, cold was prevalent at pupation until the primary constituents of the winter form—so far as they are adaptive and depend on special primary constituents—are rendered active, but then if later on, shortly before emergence, a high temperature was prevalent, and so influenced the chemistry of the formation of colour in the wing, that the upper side had the summer habit.

It would be very simply explained in this way, how Merrifield came to assign the critical time to the end of the pupal period. He was right in so far as the character *directly* dependent upon temperature is actually first determined at this time, while the beginning of the pupal period gives the decision for the adaptive characters, which are contained in the germ-plasm as duplicated primary constituents.

It must for the present still remain doubtful whether this is actually the case; one of my experiments of 1872 *contradicts* it, since in this experiment pupæ of the first brood of the year of *P. napi*, which were placed on ice for three months, shortly after pupation produced 60 butterflies with *all* the characters of the winter form both on the upper and under side, although they had been transferred to a forcing-house on Oct. 3rd, where, in fact, these 60 butterflies emerged up to Oct. 20th.

One of Merrifield's experiments, on the other hand, is *in favour* of my view. Pupæ of the same second brood of 1892 were, as in my experiment, iced from three to four months, and then, when placed in a temperature of 27° C., produced eleven butterflies, which, indeed, exhibited the adaptive green powdering of the under side in the highest degree, but exhibited the characteristic features of the winter form less on the upper side, that is to say, those characters which, according to my view, might depend upon the *direct* influence of temperature. The contradiction in the results of our experiments on both sides may perhaps be explained by the fact, that in my experiment the temperature of the greenhouse, in which I induced the pupæ to emerge, might have been too low (no note was taken of it).

If we disregard the possibility of the co-operation of direct alterations by temperature, *Pieris napi* behaves just like *Vanessa prorsa-levana*. In the open only the winter form is seen in the spring, only the summer form in the summer and autumn; but this alternation of the form does not exactly correspond to the alternation of the brood, since generally in both broods a variable percentage does not develope forthwith ("subitan"), but remains latent during the following period of flight, and first emerges in the second period following. So far as I know, it has not been ascertained by experiment how large this percentage is, nor within what limits it fluctuates; I see, however, from a remark of Merrifield, that sometimes half of the first brood of the year do not emerge in the summer, but first emerge in the next spring, and in one of my old experiments with *napi*, in which all the individuals of a large brood of the summer generation did not emerge in the summer, but first emerged in the next spring, it has been quite rightly interpreted by Merrifield as a "congenital tendency" to hereditary hybernation. It happens from this, that, under circumstances, an entire brood can remain latent the following period of flight. Influenced by the thought that the direction of the development is largely determined by external influences, I had then sought for such an influence as the cause of the phenomenon, and I believed that I could find no other for this, as I believed, quite exceptional behaviour, than the mechanical shaking, to which the pupæ were subjected during a seven hours' railway journey. In the meantime Merrifield, not, indeed, with *napi*, but with other double-brooded butterflies, occasionally saw the whole brood remain latent without any special influences; so it must here also be the result of internal causes. We shall therefore have to assume here, as with *Vanessa prorsa,* that it is not external influences alone, which decide which primary constituent is to become active, but that with a part of each brood from unknown internal causes a tendency to the activity of, it may be, the summer form, or, it may be, of the winter form, may be present from the beginning. But this tendency to the summer form is always connected with the tendency to immediate (subitaner)* development, the tendency to the winter form with delayed (latenter) development, *i. e.* if a pupa of the summer brood from wild specimens does not develop immediately, but hybernates, then it always produces the winter form, *although it is kept in warmth during the whole winter.* On the other hand, all pupæ of the second brood, in case they emerge the same autumn, produce instead the summer form; *Vanessa prorsa,* at least, behaves in this way. I have no experience with *Pieris napi* in reference to this point, and Merrifield's experiments† on it are not conclusive, as he placed only ten pupæ of the second brood immediately in a high temperature (32° C.), none of which happened to be forced, but all hybernated.

Now there might be an inclination at last to admit, that temperature had no influence in the determination of the form of the imago, and that all specimens of any brood, which assume the winter form, do so from an innate disposition; and the same with those which assume the summer form. But such a view would be refuted by the experiments. Rather the specimens of the summer brood, which are ready for immediate emergence, and at the same time for the activity of the summer form, can have their intentions altered by cold, and be induced to assume the winter form, although they do not hybernate, but emerge, as soon as they are taken from the ice into a warm temperature. They retain, therefore, their habit of immediate emergence, although they have been altered to the winter form. This is obvious, for example, from my Experiment 14 of 1872, in which the iced first brood, when placed in a forcing-house after three months, produced 60 butterflies of the winter form, while 34 did not emerge, but hybernated and produced the winter form in the next spring. Most of the 60 which developed immediately would in all probability have emerged under normal conditions in June as the summer form; the 34 which hybernated may, on the other hand, have been predisposed to delayed development (Latenz), and to the winter form.

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* This expression, which I first used in reference to the Daphnidæ, I have made bold to use here also, as the process is the same as there, only that there it is a question of the immediate (subitaner) or delayed (latent) development of *eggs*, but here of pupæ. *Cf.* Weismann, 'Beiträge zur Naturgeschichte der Daphniden,' Leipzig, 1876–1879.

† "Experiments on Temperature-Variation in Lepidoptera," in Proc. Ent. Soc. Lond. 1894, Part I., April.

Thus also a varying percentage of the second brood of the year may be induced by heat to assume the summer form, and to develop immediately; some will emerge in this form, even at the usual intermediate autumn temperature, but the greater number will incline to latency and to the winter form from the beginning in so strong a way, that they are no longer to be altered from it; but more accurate proof is still wanted on this point.

In my work of 1874, on seasonal dimorphism, I believed that I could decide, from the metabolism of a species in its different broods, which of the seasonal forms was the older and which the younger. From the observation, which is generally correct, that the brood of the summer generation in its principal part cannot be diverted from the *levana*-form by temperature, I then concluded, that this is the primary and that *prorsa* is the secondary form, since I regarded the artificial alteration as reversion to the parent form. Such, so I thought, could arise only with the younger and not with the older form. On the same ground, with *Pieris napi*, I considered the winter form the older. Although I still have the same view as to the relative age of these forms, yet I should now no longer rely on this conclusion, as, quite apart from the fact that with *V. levana* some specimens of the third brood emerge as the *prorsa*-form even in the late autumn, with a more mature insight into the processes of heredity, I cannot to-day *any longer generally employ the conception of reversion in reference to seasonal dimorphism*, as was explained above. Not that I consider it exactly incorrect to speak of reversion here, as a phyletically older form actually arises in this case; but it seems to me more convenient and more suitable for explaining the processes to limit the conception of reversion to those cases of recrudescence of an earlier living form, which do not follow in a regular cycle, that is to say, in a normal way. According to my proposition every reversion depends on the fact that a certain number of unaltered ancestral determinants are transmitted in the germ-plasm of a species, which under especially favourable circumstances (see 'Keimplasma,' p. 392) occasionally become active, and can impress the resulting individual with ancestral characters. With adaptive seasonal dimorphism such an idea of ancestral ids in the germ-plasm is to be assumed, but not as a small vestige, rather in the same number as the modern ids of the other seasonal form. Its germ-plasm is conceived of as consisting of an equal number of winter ids and of summer ids, which usually alternate with each other in the course of ontogeny. This is not quite the same as the exceptional occurrence here and there of reversion to an ancestral form on the concurrence of exceptionally favourable circumstances; it is a normal change between two germ-determinants, one of which is without doubt the older.

The origin of this alternation is not difficult to explain. With species, which, like *V. levana* and *P. napi*, were single-brooded during the glacial epoch, and were then subject to similar conditions of life as our present spring form, some of the ids of the germ-plasm, which in earlier times were homogeneous, have been gradually formed into summer ids, and at the same time the activity of these ids has been controlled by certain internal and external influences, which have resulted in the constant alternation of the two forms. The point is, that each of the two adaptive forms should arise at the right time, but not at a time and under external conditions, to which the protective colouring is not adapted. The facts teach us that this happened in a twofold way: First, from the fact that the two kinds of ids are so arranged, that they alternately promote the ontogeny; in the first brood therefore the winter ids would be active, in the second brood the summer ids, in the third brood the winter ids again, &c. And secondly, from the fact that the activity of that kind of id, which is disposed to be active, can be hindered by certain external influences, heat or cold, and at the same time the opposite kind of ids can be induced to become active. It comes to this, that the internal disposition to activity, of whose nature we can obviously divine nothing, is not always connected with an alternation of the two kinds of ids, but that in a varying percentage of individuals of any brood the same ids are also disposed to be active in the following brood. But in this case, as a rule at least, the determination of the winter id is connected with the tendency to latency (hybernation), the determination of the summer id with the tendency to immediate development.

In this way the coincidence of both adaptive forms with the conditions of life appertaining to each seems to be best assured. Generally only two broods fly with us, and for this therefore the regular alternation of the two forms from internal causes is sufficient. Now it still remains to meet the possibility that by very unfavourable influences (bad weather, preponderance of enemies), such as constantly recur from time to time, though, indeed, but rarely, the permanence of the species in a certain area might be destroyed; and this happens here, as with many other species, from the fact that a percentage, varying in each brood, carries with it the predisposition to delayed development. But in the normal way this is connected with the disposition to activity on the part of the winter ids, since otherwise the summer adaptation might arise in the spring. In each brood, however, there are also individuals whose summer ids are disposed to be active, but these generally possess also the predisposition to immediate development; this applies to all specimens, which assume the summer form at the ordinary temperature or even at an increased temperature, if they belong to the second or the third brood.

The fact that the summer ids may be induced to become active by a high temperature renders it possible for a numerous second brood of the summer form to occur in a very hot summer, as this, according to my old experiment already referred to, must be the case with *V. prorsa*, it probably is also the case with *P. napi*.

But, on the other hand, the fact that the winter ids may be induced to become active by cold provides the possibility that, if cold sets in early in the autumn, the third brood of the year should mostly hybernate, and then produce the spring form in the spring.

In spite of all these precautionary rules every specimen of a brood does not agree with the time of year, but the exceptions are rare; I do not know any case where a *prorsa* has been found in the woods in the spring or a *levana* in the summer; still intermediate forms (*porima*) occur in the summer, and I have already sought to explain them above. With *Pieris napi* a winter form or an intermediate form appears to have formerly occurred in the summer, but the differences here of the two forms are not so great or so sharp.

Theoretically the mixed forms can be easily understood from our standpoint: they depend on the fact that both determinants become active at the same time, and that consequently each of them seeks to take part in the colouring of the wings, so that sometimes the one and sometimes the other may preponderate. The same process arises, which according to my proposition takes place on the intermixing of the parents' characteristics in the child,* whereby, indeed, the *one* parent can make itself felt almost alone, and the other be entirely left out, but all conceivable combinations and intermixings of the characteristics of the parents can arise. In this case we know for certain that two separate predispositions come together on fertilization, and that consequently they are both together in the egg which is developing, while with adaptive seasonal dimorphism we only infer this from the phenomena of the change of garb.

If I now deny the correctness of my earlier conclusion as to the relative age of the alternating seasonal forms, I do not do so with *non-cyclic* species, as *Pieris napi* var. *bryoniæ*. If it is true, as it appears to be from my earlier experiments, that *bryoniæ* cannot be induced by heat to assume the *napi*-form, the conclusion would be probable, though not necessary, that *bryoniæ* is the parent form of *napi*. Now this is not a case of *actual reversion*, i.e. *of that sort which occurs exceptionally*, which could only happen if the white form had existed before the dark one, and if "white" ids, therefore, were usually still latent in the germ-plasm of *bryoniæ*. As, however, in the new experiments with *bryoniæ* here described there were isolated white specimens, a final decision must be suspended until further experiments have been made, as is stated above in the "results" of the experiments. Seitz is inclined to regard the *napi*-form as the primary one, since most of the species of *Pieris* are white; but it might be argued against this that the dark *bryoniæ* occurs in widely removed regions of the earth,—in the Alps, the Jura, and the Polar Regions,—a range which points to a common circumpolar origin and subsequent separation after the close of the glacial epoch. Against this argument, indeed, the view might be held, that the black of the female *bryoniæ* is an adaptation to a cold climate, in the sense of Lord Walsingham, which had been formed by selection independently in the Alps and in the far north. We do not get much further with the decision of the particular question, but perhaps from its profitable discussion we see afresh, how little we know of the biology of insects, and how difficult it is to obtain a true solution of particular questions.

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* Vid. in "Germ-plasm" the section on "The Struggle of the Ids in Ontogeny" (p. 260, Eng. trans.).

Now if, as I think is unavoidable, *direct seasonal dimorphism* is distinguished from *adaptive*, the question is, which of the known cases belongs to the one, and which to the other category. But in order to decide this, more accurate researches especially directed to this point are necessary, as they are not yet available. In cases in which double marking and colouring occur, which are evidently protective, as in the tropical Satyridæ bred by de Nicéville and *Junonia almana-asterie* described by Seitz as seasonally dimorphic, seasonal dimorphism can with greater safety be referred in anticipation to the processes of selection. Apparently *Grapta interrogationis* also, with its two seasonal forms var. *fabricii* and var. *umbrosa*, investigated by W. H. Edwards, is to be referred to double protective adaptation, since in this case the protective under side exhibits great differences. But, on the one hand, considerable differences are present on the upper side; and on the other, it is yet to be proved in what way the protective under side of the summer form is a better protection during the summer time, than the under side of the autumn and spring forms, and *vice versâ*. The under side of the species of *Grapta* is always to a high degree protective, but it is very different in the different species, and with many of them also appears to alter according to the time of year. I often thought that I had found a seasonal dimorphism of the under side in our *Grapta c-album*, but the matter has not been followed up sufficiently closely to enable us to exclude other explanations of the variability observed, especially individual and local differences. I consider it, however, very possible that an adaptive seasonal dimorphism of the under side will yet be found. A. Seitz has already pointed to *G. c-aureum* from Japan as an example of this. According to Edwards, in *G. interrogationis* the summer brood in Virginia has a muddy yellow under side with a complicated pattern of marking, but the autumn and spring butterflies have the brownish red of a dry leaf, and as a principal marking the bent midrib of a leaf.

So it may be supposed that with our Pieridæ with protective under sides, so far as they possess a seasonal dimorphism, they owe it to the adaptation to the finely pinnate leaves, especially to the foliage of various plants (Cruciferæ, Umbelliferæ) on which the butterfly is wont to rest. It would be interesting to observe one of these species, e.g. *Anthocharis belia-ansonia*, in its habits of life, in order to unravel the question, whether a greater similarity to the resting plant of each season does not produce the variations in the green and white pattern of the under side, which are not altogether insignificant.

Such cases would only be explained by a double process of selection, which in the first brood rejects those specimens which during the summer guarantee less protection to the resting butterfly; and in the second, those which guarantee less protection in the autumn or spring. This process of selection must always have been double; moreover, if a single-brooded species, which already possesses adaptive colouring, is induced by a warmer climate to interpolate a second brood, then in this case the necessity of the adaptation of the second brood of butterflies to the altered environment of the later summer will first, indeed, have chosen out only the individuals of this second brood itself, but very soon the hereditary transmission of the newly assumed characters of the second brood will have made itself felt on the first brood, and rendered necessary a rejection of the individuals possessing them. A double adaptation can only be realised and retained by continual sifting of both broods, and, as it appears to me at least, this has only become possible under the further hypothesis that several ids* (anlagen) of the wings and of the whole insect are contained in the germ-plasm of each individual, from which some can be reared in this direction, and others in that, while at the same time they are adapted to different excitants which give them scope for action,—heat, cold, &c.

In cases of pronounced double adaptation of a protective nature, we may safely infer such an origin of seasonal dimorphism; but with butterflies seasonal dimorphism is not confined to the under side, but accompanying these differences, which are certainly protective, there are also some on the upper side. With *Vanessa levana-prorsa* this is the other way about, *i.e.* the upper side is more strongly variable than the protective under side. On the latter there is in *levana* a large washed-out lilac spot, which is either entirely absent in *prorsa*, or at least is slightly indicated on the hind wings only; on the other hand, *prorsa* exhibits the white band below, which is covered with yellowish and brownish tones in *levana*. *V. levana*, therefore, at any rate while at rest, is well adapted to the numerous dry leaves of the spring wood; I do not know, however, whether they rest on the ground. *V. prorsa*, indeed, spends the night on plants—brambles, danewort (*Sambucus ebulus*), and the like—and is well protected by this very white band, which is also visible when it is at rest, in the neighbourhood of white flowers.

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* *Cf.* note on p. 205, where 'anlagen' is used as synonymous with 'determinant.'—Translator.

Although the upper side of most butterflies has no sympathetic colouring, still I will in no way dispute that such may occur in quite a general sense, and even the *levana*-form may to some extent be protected in flight by its agreement in colour with the yellowish-brown dry leaves of the spring wood. But generally protective colouring of the upper side will arise as mimicry.

Although I have considered *prorsa* under this point of view, I should still expect that cases of mimicry would be rarely connected with seasonal dimorphism. It is not, indeed, impossible, but improbable, that any tropical species has mimicked one of the protected species for the rainy season, and another protected form for the dry season. It is the case that a species requiring protection has adapted itself to a different protected Danaid in Ceylon than in Malacca and in Java; examples are also known where the male resembles a different protected type from the female, but hitherto, at least, it has not been observed that *periodic* dimorphism occurs in a species with double mimicry.

It is still more difficult to decide whether we have to do with pure *direct seasonal* dimorphism in any particular case. The experiments justify its assumption with *Chrysophanus phlœas;* and with *Pararge egeria* and *Vanessa urticæ* the climatic variations may well be regarded as the direct effects of the different temperatures; but it is difficult to decide whether, and, if so, how far, double adaptation takes part in this or—with climatic variations—sexual selection. When, for example, Merrifield* finds with a Geometer, *Selenia illustraria*, that low temperature applied to the pupæ impresses the perfect insect with the dark winter form, and high temperature the bright summer form, this might be well regarded as the direct effect of temperature. But when one considers that the actual cause of the variability of both broods might possibly be an adaptation of the upper side of the moth to the different surfaces, on which it sits in the spring and in the summer, the possibility remains that processes of selection and not temperature have produced them.

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* Merrifield, "Systematic Temperature Experiments on some Lepidoptera in all their Stages," in Trans. Ent. Soc. Lond. 1890, p. 131.

But now Merrifield,* with another Geometer with a leaf-like cut to its wings, *Ennomos autumnaria*, could in like manner produce a darkening of the upper side of the ochreous moth by cold, although it has only one brood in England, and also in Germany. It looks as if this must still be the direct effect of cold; still we cannot maintain this without going further into the matter. It might be reversion to a more darkly coloured parent form. The remarkable alterations have already been above referred to in passing, which Dorfmeister, Merrifield, and Standfuss obtained in butterflies by the application of ice or of great heat to their pupæ, and it was then noted, that Dr. Dixey considered the majority of these aberrations as reversions to earlier forms, and that for particular cases, at any rate, he has made this very probable. But this can scarcely apply to all, and some of these alterations of colour may well be regarded as the direct influence of temperature on the colour-chemistry of the wings.

Now my experiments with the Neapolitan *Chrysophanus phlœas* prove that such temperatures as create alterations slowly influence the germ-plasm also, and thereby enable the alteration to become hereditary; so these direct alterations of colour by the climate cannot well be entirely without significance, although they certainly have less significance for the metamorphism of the species of Lepidoptera, than I formerly ascribed to them before the recognition that a large part of seasonal dimorphism must depend upon selection.

Perhaps the future will place us in the position of being able from the critical period of the effect of temperature to draw inferences as to the nature of the alteration. Should the view given by me above be confirmed, and the observations which at present stand opposed to it be explained in another way, we should be in such a position; but at present the facts are not yet sufficient for it. The very carefully carried out experiments of Merrifield above referred to do not yet afford any safe conclusion on the question, whether the critical time for the coming into activity of *one* of the two double-determinants always lies in the beginning of the pupal period, and whether alterations of colour, which in the end proceed from the influences of temperature, are always to be regarded as direct alterations of the colour-chemistry.

With *Selenia illustraria* the pupæ of the summer brood, which were iced immediately, produced winter form with dark colouring and marking; pupæ of the same brood, which were iced for twelve weeks and then forced at 27° C., produced a much brighter moth with rather dark marking.

Merrifield concludes from this, that the critical time for the

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* Merrifield, "Conspicuous Effects on the Markings and Colouring of Lepidoptera caused by Exposure of the Pupæ to different Temperature-Conditions," Trans. Ent. Soc. Lond. 1891, p. 155.

marking is the beginning of the pupal period, but for the ground colour the end of it. Now the "marking" is only something separated from the "ground colour" in our ideas; as a matter of fact it is not here, as in a picture, where there is first the drawing and then the colour is laid on it; but what we call "marking" is only another stripe of colour of the one layer of coloured scales, which determines the colouring of the wing. "Marking" therefore is genetically the same as "colouring," and biologically also, in so far as they work together for a sympathetic or striking colouring. I will not, however, deny that under certain circumstances colourings may appear, which are actually of different origin from the pattern of colour originated in the germ-plasm; I see, for example, such a case in the black powdering of the southern form of *Chrysophanus phlœas*, the var. *eleus*; but if the surface of the wings is sympathetically coloured, as is certainly the case with this *Selenia*, then the whole pattern of colour is already contained in the germ by natural selection, and makes up the biological value of the colouring. To which it may be added that with *Selenia illustraria* the marking of the summer form is exactly the same as that of the winter form, only much fainter, and to some extent almost or entirely washed out; it is nothing quite new as with *Vanessa prorsa*, as opposed to *levana*. On this account the changes of colour observed by Merrifield would perhaps be more appropriately explained by the fact that the determinant of the winter form is set free by cold, but that the summer temperature following later on enables the summer determinant also to become active, and that the two determinants now work together and produce an intermediate form. But this would be a contradiction of my view that the beginning of the pupal period is actually the critical moment for the double determinants contained in the germ. The questions here stated can only be answered by further experiments definitely directed to this point on as many species as possible.

We may now at any rate go so far as to say, that the temperature *before* pupation has no influence on the colour and marking of the perfect insect. My experiments with *phlœas* already pointed to this, in so far as in this case the larvæ which hatched from Neapolitan eggs produced very different butterflies, although the pupæ only had been subjected to different temperatures, but the larvæ were all treated exactly alike. Merrifield has shown for *Ennomos autumnaria*, that the very different temperatures in which the larvæ may be reared are without influence on the colouring of the perfect insect. Therefore although, as we have recently learnt, the form of the wings of the imago is outlined very early in the larva,* yet the decision as to which of two wing-determinants of an adaptively seasonally dimorphic species shall become active, is, at the earliest, given at the beginning of the pupal period.

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* E. Verson, 'La formazione delle ali nella larva del *Bombyx mori*,' Padova, 1890; and J. Gonin, 'Recherches sur la métamorphose des Lépidoptères,' Lausanne, 1894.

NOTES ON THE SYNONYMY OF NOCTUID MOTHS.

By Arthur G. Butler, Ph.D., F.L.S., &c.

(Continued from vol. xxviii. p. 276.)

Trigonia, *Guen.* = Claterna, *Walk.*

Claterna, Walk., Cat. xv. p. 1543, is synonymous with this genus, the type being very closely allied to *T. cydonia*, Cram.; it is significant of the value of the family characters recognized by Messrs. Guenée and Walker, that *Trigonia* is placed in the Platydidæ, and *Claterna* in the Focillidæ. *Trigonia* being preoccupied in Mollusca (1791), *Claterna* will stand.

The following genus probably belongs to the Thermesiidæ; if, as I believe, I have rightly made out the affinities of the typical species, *R. curvicosta*.

Renodes, *Guen.*

Renodes sigillata.

Thermesia sigillata, Walker, Lep. Het. xv. p. 1562, n. 4 (1858).
T. credibilis, Walker, *l. c.*, p. 1565, n. 8 (1858).
Poaphila profecta, Walker, *l. c.*, p. 1836 (1858).
St. Domingo. Types in Coll. B. M.

Episparis, *Walk.*

Neviasca and *Pradiota*, Walk.

Walker described *Episparis* as a Trifid Noctuid of the family Orthosiidæ, *Neviasca* as a Deltoid of the family Platydiidæ, and *Pradiota* as a Geometrid of the family Macariidæ; and he described the same species in each of these widely separated families.

Episparis varialis.

Neviasca varialis, Walker, Lep. Het. xvi. p. 7, n. 1 (1858).
Episparis signata, Walker, *l. c.*, Suppl. 3, p. 1032 (1865).
Pradiota sejunctata, Walker, *l. c.*, 5, p. 1572 (1866).
Episparis exprimens, Walker, Trans. Ent. Soc., 3rd ser., vol. i. p. 106 (1862–3).
India, Ceylon, Java, Borneo. Types in Coll. B. M.

This is merely an oriental form of the African *E. penetrata;* the latter varies more, but probably is rather dimorphic than variable; the eastern type has the dark marginal crescent edged internally with white.

AMPHIGONIA, *Guen.*

FOCILLA (part) *Guen.*

Amphigonia recurva.

Focilla recurva, Walker, Lep. Het. xv. p. 1530, n. 5 (1858).
F. consurgens, Walker, *l. c.*, p. 1531, n. 6 (1858).

Espiritu Sancto, Western Coast of America, Venezuela. Types in Coll. B. M.

Walker's so-called variety of his *F. recurva* is simply the male. The species is nearly allied to *A. centurialis* of Hübner (Zutr. figs. 295, 296).

M. Guenée says of his genus *Amphigonia* that it is based upon three species, which he has not been able to examine at the same time. Probably, if he had, it would have struck him that several of his species of *Focilla* (placed in the preceding family Focillidæ) were congeneric with *Amphigonia*, and that there was no family distinction between the types of the two genera.

EPHYRODES, *Guen.*

Liviana, Leida and *Maltana*, Walker; *Zethes* and *Ephyrodes* (part), Walker.

Ephyrodes cacata.

Ephyrodes cacata, Guenée, Noct. 3, p. 366, n. 1844 (1852).
E. omicron, Guenée, *l. c.*, n. 1845 (1852).
Zethes quatiens, Walker, Lep. Het. xv. p. 1523, n. 2 (1858).
Ephyrodes implens, Walker, *l. c.*, p. 1588, n. 3 (1858).
E. exprimens, Walker, *l. c.*, p. 1589, n. 4 (1858).
E. jurgiosa, Walker, *l. c.*, p. 1590, n. 5 (1858).
E. scitilinea, Walker, *l. c.*, n. 6 (1858).
E. comprimens, Walker, *l. c.*, p. 1591, n. 7 (1858).
Liviana pallescens, Walker, *l. c.*, Suppl. 3, p. 1035 (1865).
Leida pallida, Walker, *l. c.*, p. 1036 (1865).
Maltana thermisioides, Walker, *l. c.*, 5, p. 1975 (1866).

Parà, Bahia, Venezuela, St. Domingo, Chiriqui. In Coll. B. M.

GALAPHA, *Walk.*

Thyridospila, Walk. (not Guen.).

That this is not M. Guenée's genus is evident, for he says that, in *Thyridospila*, the thorax is narrow, the abdomen long and extending beyond the lower wings, flexuous at the extremity, terminated by a tuft of bifid hairs, which conceal two little smooth and recurved hooks (which remind one somewhat of those of the *Forficulæ*); the intermediate tibiæ cleft, and bearing a silky membrane covered with scales. The secondaries of the sole species are also said to have two angles. None of the above characters are found in the *Thyridospila* of Walker, one of the species of which genus appears to be Guenée's *Amphigonia isoa*.

The genus *Galapha* will now contain *Hypernaria sublineata*, Walk., *Galapha antecedens*, Walk., *Thyridospila rubricosa*, Walk., *Amphigonia isoa*, Guen., = *Thyridospila turbulenta*, Walk., *Thyridospila ustipennis*, Walk., and *Focilla intacta*, Felder.

Galapha antecedens.

Galapha antecedens, Walker, Lep. Het. xv. p. 1544, n. 1 (1858).

Focilla facunda, Felder, Reise der Nov. Lep. 4, pl. cxviii. fig. 21.

Ega and Espiritu Sancto. Type in Coll. B. M.

I strongly suspect that this is no more than a variety of *G. sublineata*, with which it closely agrees in pattern, though more brilliant in colouring; in the same way, in all probability, *Focilla intacta* of Felder will prove to be a dull form of *F. rubricosa*, Walk.

Galapha isoa.

Amphigonia isoa, Guenée, Noct. 3, p. 338, n. 1804 (1852).

Thyridospila turbulenta, Walker, Lep. Het. xv. p. 1527, n. 2 (1858).

Focilla epulea, Felder (? Herrich-Schäffer), Reise der Nov. Lep. 4, pl. cxviii. fig. 24.

Villa Nova, Ega, and Tapajos (*Bates*). In Coll. B. M.

The form of Herrich-Schäffer's figure differs from, and the markings of the secondaries especially do not correspond with, that of Felder.

The following genera associated under his family Bendidæ by Guenée must be considered here, the genus *Bendis* itself being allied to *Galapha*:—

ITONIA, *Hübn.* (not *Guen.*).

Itonia lignaris.

Itonia lignaris, Hübner, Exot. Schmett. Zutr. figs. 317, 318.

I. opistographa, Walker (not Guenée), Lep. Het. xiv. p. 1338, n. 1 (1857).

Var. ? *I. intrahens*, Walker, *l. c.*, xv. p. 1822 (1858).

Venezuela, Honduras, and Sta. Martha. In Coll. B. M.

PSEUDOBENDIS, n. gen.

Itonia, Guenée (not Hübn.).

Structurally this genus is very close to *Remigia*, the woolly under surface of the wings and broadly-fringed legs being very similar; it differs however considerably in pattern (especially on the secondaries), the angulation of which and the ciliation of its antennæ readily distinguish it. In every detail, excepting the woolly clothing of the wings, it still more nearly corresponds with *Hulodes*, next to which it should stand.

Pseudobendis opistographa.

Itonia opistographa, Guenée, Noct. 3, p. 212, n. 1614, pl. 23, fig. 4 (1852).

I. multilinea, Walker, Lep. Het. xv. p. 1823 (1858).

Honduras. In Coll. B. M.

The true *Itonia*, Hübn., in which the secondaries are not angulated (though obtusely subangulated), has naked legs, and no woolly clothing to the under surface of the wings.

BENDIS, *Hübn.*

Bendis formularis.

♂ *Bendis formularis*, Hübner, Exot. Schmett. Zutr. figs. 903, 904.

♂, ♀ *B. impar*, Guenée, Noct. 3, p. 217, n. 1624 (1852).

♀ *B. poaphiloides*, Walker (not Guenée), Lep. Het. xiv. p. 1341 (1857).

♂ *B. fusifascia*, Walker, *l. c.*, xv. p. 1823 (1858).

♀ *Ephyrodes postica*, Walker, *l. c.*, Suppl. 3, p. 1071 (1865).

St. Domingo, Honduras, St. Vincent, Trinidad, Jamaica. In Coll. B. M.

Felder has incorrectly figured a worn example of the female (Reise der Nov. Lep. 4, pl. cxix. fig. 16) as *B. irregularis*. As M. Guenée points out, the latter has an oblique orange-margined blackish stripe through both anterior and posterior wings.

Bendis irregularis.

Bendis irregularis, Hübner, Samml. Eur. Schmett. Noct. fig. 361.

Zethes umbrata, Walker, Lep. Het. Suppl. 3, p. 1024 (1865).

—— ? In Coll. B. M.

Bendis pelidnalis.

♀ *Lesmone pelidnalis*, Hübner, Exot. Schmett. Zutr. figs. 169, 170.

♂ *Bendis angina*, Guenée, Noct. 3, p. 215, n. 1619 (1852).

Ophiusa undulifera, Walker, Lep. Het. Suppl. 3, p. 970 (1865).

♀ *Thermesia illiturata*, Walker, *l. c.*, p. 1064 (1865).

—— ? (*Milne Coll.*) In Coll. B. M.

It is probable that our examples of the two preceding species were obtained from Surinam, but it is impossible to trace their origin. They are very old specimens, and may have formed part of Drury's collection originally.

Bendis poaphiloides of Guenée appears to me to be Walker's *Thermesia glaucescens*, which is only a small form of his *T. suffusa* = *T. cinctifera*. I have referred the species to the genus *Argidia*, but our examples are all females, and therefore it is possible that I may be wrong. In any case I do not believe the species to be a *Bendis*, the unangulated wings and almost central character of the transverse stripe not being at all characteristic of this genus.

Bendis pangonia of Guenée is, without question, identical with Walker's *Naxia calorifica*, the type of the genus *Delgamma*. The locality, "Brazil?", is of course incorrect, as it is an Indian species; but Guenée says:—"Je ne suis pas bien sûr de la patrie de cet insecte, et il pourrait se faire aussi qu'il n'appartient pas à ce genre."

Bendis limonia is included by Herr Moeschler in his account of a collection received from Jamaica. The description of M. Guenée seems to point to a species of *Orthogramma*, allied to *O. lurida*:—"Cuisses antérieures munies d'un faisceau de poils jaunâtres et d'un autre faisceau d'un brun-noir luisant." Cayenne is given as the locality; but M. Guenée says that he received two specimens from M. Feisthamel,—one marked with "Cayenne," and the other "India."

Bendis magdalia can hardly belong to the genus, the wings being entire, with the transverse band on the secondaries central. *B. ellops* may be allied to *B. pelidnalis*, but I strongly suspect it to be an *Orthogramma*.

Bendis hinna.

Acolasia hinna, Hübner, Exot. Schmett. Zutr. figs. 971, 972.
Bendis gurda, Guenée, Noct. 3, p. 216, n. 1623 (1852).
Poaphila pulverosa, Walker, Lep. Het. Suppl. 3, p. 994 (1865).
P. cinerea, Butler, P. Z. S. 1878, p. 488, n. 101.
Texas, Jamaica. In Coll. B. M.

M. Guenée gives the Isle of St. Thomas as the locality of his *B. gurda*; and Walker was unable to give the locality of his *Poaphila pulverosa*, which was one of the old specimens from Milne's collection. I have only seen females of *B. hinna*, which greatly resemble *Poaphila*, excepting that the primaries are subangulated. Near to it in the Museum collection I found Walker's *Poaphila perspicua* (another species the locality of which was unknown); it is certainly Grote's *Phurys glans*, which it will supersede.

Bendis detrahens.

Poaphila? detrahens, Walker, Lep. Het. xv. p. 1834 (1858).
Trama arrosa, Harvey, Bull. Buff. Soc. 3, p. 13 (1875).
E. Florida, Texas, and Kansas. Types in Coll. B. M.

This is such a typical-looking *Bendis*, that even if the name *Trama* were not preoccupied in Hemiptera there could be no object in adopting it.

The genus *Pleonectyptera* appears to be a Thermesiid. *P. geometralis*, Grote, is = *Poaphila irrecta*, Walk.; and (speaking of *Poaphila*) *Poaphila contacta* and *P. subordinata* of Walker must be added to the synonymy of *Panula inconstans*, Guen.

Poaphila? paucula, Walk., seems nearly allied to *Pleonectyptera phalænalis*, Grote, though a perfectly distinct species.

The genus *Milyus*, Wlk., will supersede his *Chabora;* the typical species *M. mixtura* comes (not from Africa as stated by Walker) from Jamaica, and is the male of *Azeta uncas; Azeta* will take priority over both genera.

Walker described a genus *Corna*, and placed it in the Poaphilidæ; the type species *C. inconspicua* he subsequently described (p. 1089) as *Hypernaria? tenebrosa.* This genus belongs to the Trifidæ, and is nearly allied to *Stellidia*, Guenée, originally described as a genus of Geometrites, of the family Boletobidæ. *Capnodes cinerea,* Butler, from Japan, must be referred to *Stellidia.*

(To be continued.)

NOTES AND OBSERVATIONS.

The Light Form of Vanessa c-album.—I have just taken some more of the light form of this species in Shropshire. As no name appears to have been given this very distinctive seasonally dimorphic form of *V. c-album*,—which occurs as the type of the first generation upon the Continent, but only as an aberration of the same brood in this country,—I beg to propose the name *lutescens* for it.—W. Harcourt-Bath; June 29th, 1896.

Another Use for Naphthalin.—When my insects revive after they are set, instead of dropping a little chloroform on them, which sometimes spoils the appearance of the specimen, I cover them with naphthalin, which soon kills and leaves no other trace behind. As the "emeralds" will not stand the vapour of ammonia, I stupify them in the cyanide-bottle sufficiently to set them, then cover them with naphthalin, and in a short time they are dead.—F. Hilton; 184, Stamford Hill, N.

Euchloë cardamines at Rest.—On June 21st, near Esher, I came across a specimen of *Euchloë cardamines* at rest on the uncurling tip of a bracken frond, where it was well protected by resemblance, the mottled under surface of the hind wing harmonising wonderfully well with the green knobs of the unfolding fern covered with whitish down. One could almost fancy that this position was assumed after deliberate thought; but I suppose the fact is rather that the peculiar markings on the under surface of the hind wings harmonise with many plants whose foliage is finely divided, just as they do with the blossoms of some of the Umbelliferæ.—W. J. Lucas; Knight's Park, Kingston-on-Thames.

Dragonflies caught by Drosera.—On June 27th, at the Black Pond, near Esher, Surrey, I noticed several small dragonflies caught by the *Drosera*, which was in fine condition. On one plant of *D. rotundifolia* there were no fewer than four dragonflies, three living males of *Enallagma cyathigerum*, and one dead female, no doubt of the same species.—W. J. Lucas; Knight's Park, Kingston-on-Thames.

Note on the Early Stages of the Larva of Polia chi.—There is a curious point in the development of the larva of *P. chi* not mentioned in Newman or Stainton, neither does Mr. Arkle mention it in his note on the breeding of this species and its variety *olivacea* (Entom. xxix. 61), *i.e.* the larva, when newly hatched, has only the two posterior pairs of ventral claspers developed, the second pair being indicated by two small papillæ, only visible under a powerful lens; the anterior pair not visible at all. The young larva loops like a geometer. After the first moult, the second pair of claspers are more fully developed, but are destitute of hooklets, and are not used in walking; the anterior pair only just visible. It is not till after the third moult that the second pair are fully developed and used in walking, the anterior pair not being developed till a moult later, and are, even then, smaller than the three other pairs, and, as often as not, are not used in walking, neither are they used in grasping the food-plant when the larva is at rest. These observations were made on the larvæ from ova laid by a female var. *olivacea*.—N. F. Searancke; Mitcheldean, June 16th, 1896.

A Hymenopterous Parasite.—About the middle of April this year, at Bidarray in the Lower Pyrenees, I found, under a stone near a river, a cocoon of a species of Lepidoptera unknown to me, of an inch long and half an inch in diameter; the pupa-case, a brown, hard, smooth, slightly curved cylinder, bearing no trace of segmentation or form of imago. I placed it in a tin box; on opening this on May 10th some five or six hymenopterous insects were found crawling about, some took flight, but a specimen or so were captured. On examination of the pupa-case it was observed that at either end was a small aperture gnawed; on opening the case the lepidopterous imago, withered and dry, was found to occupy a bare fourth of the space, the remainder being filled with a colony of twelve hexagonal cells, four in the centre, eight surrounding them, like a piece of honeycomb made of yellow silk. Sharp, in his work on "Insects" (Cambridge Nat. Hist.), mentions a Brazilian sawfly which constructs its nest on the bee comb system, protecting the whole with a thick outer wall. In this instance the protective wall was built by the larva of a lepidopteron, whose larval parasites constructed within it, in accordance with the instincts of their order, pupa-cells of the form best suited to the economy of space in their cramped situation. A female imago of this hymenopteron measured three-eighths of an inch, the ovipositor adding another eighth of an inch. The head and thorax were black. Abdomen orange, darkening to black, and ending in a white spot just above the ovipositor. The first pair of legs was inserted far forward on the thorax, the other two pairs close together far back; the hind pair was the longest. The wings were four. A male specimen was coloured similarly, but measured an eighth of an inch less, and was more miniature in all his parts. Under the microscope the legs showed the divided trochanter of the sub-order Hymenoptera Parasitica, and the venation of the wings proved to be that of the family Ichneumonidæ. The antennæ long, reaching to tip of wings, black, with a bar of white in the middle, consisting of thirty-three joints, more closely compacted nearer the extremities. Legs with divided trochanters, tibiæ furnished with a long hook, tarsi five-jointed, the last joint furnished with two hooks. Ovipositor length of abdomen, consisting of three pieces, the centre a smooth, hard, sharp-pointed borer, the outer sheath of two pieces softer and hairy. The whole insect was hairy. The position of the ovipositor in an incomplete female in one of the cells struck me as curious, being curled over and laid along the back of the abdomen.—Rose Haig Thomas; The White House, Basildon, Reading, July 3rd, 1896.

Larva of Dicranura vinula and its Weapon of Offence.—On July 2nd I found three full-fed larvæ of *Dicranura vinula*, on a willow tree, which I took home with me. The next day, on my looking into their cage to see if their leaves wanted changing, one of the larvæ suddenly squirted up a quantity of poisonous fluid with great force into my right eye. In the most intense agony I rushed off to the doctor, who pronounced the eye-ball to be in a dangerous condition, and said that the poison must have been of a most virulent nature. For some hours I could not see at all with the injured eye, and it was some days before it had recovered. At the time of this extraordinary occurrence my eye was quite *two feet* away from the caterpillar, thus showing the great force it must have used. I have bred hundreds of these larvæ before, and examined them closely in all their stages, but have never noticed this peculiarity before; though, of course, many kinds of larvæ slowly emit a greenish fluid when irritated. Can any of your readers tell me of similar instances of this extraordinary propelling force in any larvæ? Could the larva have shot from its mouth, or from the red filaments in its two tails? It certainly made a wonderfully good shot!—H. W. Shepheard-Walwyn; Glensyde, Bidborough, near Tunbridge Wells.

[The fluid which caused the unpleasant effect was formic acid, and it was ejected by the larva from an orifice placed on the under side of the segment immediately following the head. When at rest, the head itself is withdrawn into the first thoracic segment, and the opening referred to is then in position, and ready to discharge the irritating fluid. Possibly, however, the larva only uses this means of defence under exceptional circumstances.—Ed.]

The late Mr. J. A. Cooper's Sale.—Another collection, that of the late Mr. J. A. Cooper, of Leytonstone, has recently been broken up at Stevens's, and considering the time of the year, and the fact that it contained few rarities or varieties, the total of £146 12s. 6d. realised may be considered satisfactory, notwithstanding the inclusion in that figure of two cabinets. Practically the only variety of any note was the fine var. of *Polyommatus phlœas* figured in the 'Entomologist' for last June, which made £2 10s. Twenty-three specimens of *Deilephila galii*, all bred by Mr. Cooper from larvæ found by himself at Aldeburgh, Suffolk, in the well known *galii* year, fetched an average of about 4/6 each. A specimen of *Sphinx pinastri*, well authenticated (but with no history in the catalogue), realised 32/6. Thirteen *Nola centonalis* went for £2 7s.; and a lot of Arctias, including a confluent var. of *A. villica* (once belonging to the writer), 28/–. The cheapest lots in the sale were probably two series of vars. of *Arctia caia*, the first including three with golden yellow hind wings, and a fine dusky specimen not specifically mentioned in the catalogue, realised 37/6; the second, a somewhat similar lot, but not quite so strongly marked, 21/–. *Lælia cænosa* went for 5/6 each. A lot of eight *Acronycta strigosa*, with four *A. auricoma* and others, 22/–. It was surprising to see a well-known dealer buying *Pachnobia alpina* at a shade over 3/6 each; whilst eleven specimens of *Toxocampa craccæ*, with sixty-seven other insects, only fetched 6/– the lot. An asymmetrical male *Angerona prunaria*, with a long series of pretty but not particularly striking forms, fetched 45/–; and a fine dark *Abraxas grossulariata* 50/–. The two cabinets sold very well, a 40-drawer Gurney £27 6s., and a 36-drawer Brady £16 16s. I much regret to see the preliminary announcement of the dispersal next autumn of Mr. C. A. Briggs's fine and well-known collection. It is not long since I had the pleasure of looking over it, and I think I may say without question that it will be the finest sale held since Howard Vaughan's, a good many of whose specimens it contains.—Thos. Wm. Hall; Stanhope, The Crescent, Croydon.

CAPTURES AND FIELD REPORTS.

Collecting in the New Forest.—I was staying at Lyndhurst from May 22nd to June 1st with Mr. A. D. Wilson, and below is a list of some of our captures during that time:—Rhopalocera were fairly scarce, *Argynnis euphrosyne* and *Gonopteryx rhamni* being far the commonest. *Argynnis selene*, *Hesperia sylvanus*, *H. tages*, *Syrichthus alveolus*, *Lycæna argiolus*, *Thecla rubi* and *Euchloë cardamines*, were also on the wing: but we could not come across any *Nemeobius lucina*, although we went to Stubby Copse, and met entomologists who had taken some specimens the day before in splendid condition. The moths taken during the day were:—*Macroglossa fuciformis* (flying over the rhododendrons at the Rhinefields), *Scodonia belgiaria* (on a heath near Lyndhurst we took over four dozen, the males and females being in equal proportions), *Lithosia mesomella*, *L. aureola*, *Euthemonia russula*, *Tanagra chærophyllata*, *Euclidia mi*, *E. glyphica*, *Anarta myrtilli*, *Ephyra punctaria*, *E. trilinearia*, *Venilia maculata*, *Anaitis plagiata*, *Tephrosia consonaria*, *T. crepuscularia*, *Melanthia ocellata*, *Odontopera bidentata*, *Cidaria comma-notata*, *Drepana falcula*, *D. unguicula*, *Iodis lacteria*, *Corycia temerata*, *Ellopia fasciaria*, *Fidonia atomaria*, *F. piniaria*, *Thera obeliscata*, *Larentia pectinitaria*, *Hylophila prasinana*, and *Phytometra ænea;* while *Ligdia adustata*, *Coremia propugnata*, *Lithosia aureola*, were taken at dusk. We sugared every night, but the results were not nearly as good as we expected. The nights were very cold and misty, and this may have had something to do with the scarcity of moths at the sugar. We got however the following moths:—*Moma orion* (only one perfect specimen), *Aplecta herbida*, *Grammesia trilinea*, *Thyatira batis* (the commonest moth at sugar, and in very fine condition), *Noctua festiva*, *Miana strigilis*, *Agrotis exclamationis*, *Acronycta megacephala*, *A. psi*, *Gonoptera libatrix*, *Tephrosia extersaria*, and *Melanippe montanata*. Larvæ were very abundant, especially during the first two or three days, but most of them were ichneumoned. By beating the oaks we obtained over fifty larva of *Catocala sponsa*, and only three *C. promissa;*

the other larvæ were *Thecla quercus*, *T. betulæ*, *Limenitis sibylla* (one pupated the same day on which we found it, and the imago emerged on June 6th), *Argynnis paphia*, *Bombyx quercus*, *B. neustria*, *Amphipyra pyramidea*, *Tæniocampa miniosa*, *T. munda*, *Cleora glabraria*, *Liparis monacha*, *Hylophila bicolorana*, *Cymatophora ridens* (not nearly as abundant as in 1894 and 1895), *C. flavicornis*, and *Diloba cæruleocephala*.—H. O. Wells; Hurstfield, The Avenue, Gipsy Hill, July 7th, 1896.

From June 29th till July 8th my whole time, with the exception of one rainy day, was spent in extracting gorgeous specimens from what seemed at first sight an inextricable mass of forest. Lepidoptera and Coleoptera were the favoured branches of natural history—*chacun à son goût*. The weather was completely as it should be for collecting, and many were the excursions made by day under a sun that gave out heat enough to daunt any save ardent entomologists. It was fairly surprising, to one who has not done much collecting before in the forest, to note the swarm of "bug-hunters" that invaded the place, and will continue to invade it, until the objects of their pursuit become extinct. Each night, at sugaring time, the favoured spots were ablaze with lanterns, carried by "similarly afflicted ones," hurrying from patch to patch, endeavouring to capture their rarities, and at the same time throwing a hurried glance at the trees in their rear, for fear of possible poachers. At times one might be fortunate enough to secure the two best rides for night work, but such a keen rush is made for these places that the most determined takes possession at 4 p.m., thus having to wait four hours in solitude until the "sticky" time arrives. Of course the holder has the consolation of witnessing the would-be holders walk past with disgust written on their faces, which immediately gives way to sarcasm should conversation ensue. How the collector feels if the night turns out an utterly unprofitable one I am glad to say I do not know. *Limenitis sibylla* swarmed, and always with it, but in greater numbers, *Argynnis paphia*. Two black (one without a trace of white) varieties of the former, and a variety coming between *valesina* and the type of the latter, head the list of the Rhopalocera. A male *A. paphia*, with white spots, was also taken; and what I consider to be the best thing I saw, a strikingly handsome variety of the male *A. paphia*, I missed; my hand trembles now, as I think of that fatal moment. But more valuable space I must not use with talk. The following list includes insects taken or seen during daylight;—*Argynnis selene*, *A. adippe*, *A. paphia* and var. *valesina*, *Vanessa atalanta*, *V. polychloros* (saw one), *Limenitis sibylla* and two of the black variety, *Apatura iris* (saw one), *Satyrus semele*, *Thecla quercus*, *Lycæna ægon*, *Hesperia sylvanus*, *Bombyx rubi*, *Nemeophila russula*, *Boarmia roboraria*, *Metrocampa margaritaria*, *Cleora glabraria*, *C. lichenaria*, *Pseudoterpna cytisaria*, *Phorodesma bajularia*, *Bupalus piniaria*, *Eubolia plumbaria*, *Hypena proboscidalis*, and *Endotricha flammealis*. Night captures are perhaps rather more numerous. Among these were:—*Acronycta tridens*, *Leucania turca*, *Triphæna subsequa*, *Erastria fuscula*, *Catocala sponsa*, *C. promissa*, *Toxocampa pastinum* (I have never known this at sugar before), *Aplecta herbida*, *Nola strigula* (very abundant), *Lithosia mesomella*, *Calligenia miniata*, *Boarmia roboraria* (female), *B. repandata* var. *conversaria*, *Aventia flexula*, and *Melanthia albicillata*. *C. promissa* at best is a "slippery customer," and one that wants well knowing before you can expect to obtain a fine series. To net them is useless; once inside the net they invariably emerge in hopeless fluff. To bottle them straight away off the tree is practically the sole way of obtaining them perfect, but often they won't wait for the bottle. Long before it is dusk they will come to the sweets; but from 9 p.m. till 9.30 or 9.45 p.m. is the time when they may fairly be called "thick," that is to say, two and three on a tree. Forty was our biggest take in one night. A word about *T. subsequa*: Is this in a true sense a distinct species from *T. orbona?* A well-known local collector in the forest told me he had obtained ova from *subsequa*, and therefrom bred *subsequa* and *orbona* intermixed, pointing out at the time the specimens.—C. J. Nash Pitnacree, Culver Road, Reading, July, 1896.

Lepidoptera of Argyllshire.—The following is a list of some of the Macro-Lepidoptera which I have taken in Argyllshire about Loch Riddon during the last few years, and chiefly in the months of August and September. In a little book, entitled 'The Fauna and Flora of Clydesdale and the West of Scotland,' 1876, Mr. King gives a list of the Lepidoptera taken chiefly within ten miles round Glasgow on the north side of the Clyde, and at a few outlying localities. I suppose Loch Riddon might come among such outlying localities as it is an offshoot of "The Clyde," and so it is not surprising that almost every insect that I took had been already recorded for the district. The country is mountainous, and well wooded near the sea-level.

Rhopalocera:—*Pieris brassicæ.* Larvæ were found every year about the garden; pupæ were generally attached to the trunks of some small trees in a neighbouring plantation.—*Vanessa urticæ.* Imagos hybernated every year in the house; they would sit upon the ceilings in dark corners and passages all through August, even when the weather was very hot, and when disturbed they would immediately go back to their places and settle down quietly as before.—*Erebia æthiops* (*blandina*). Very common in places; I took one female specimen which has no white centres to the black spots on the fore wings, and as these black spots are rather larger than usual and contained in a somewhat extra wide chestnut blotch, the insect has a curious appearance.—*Lycæna icarus.* One specimen on August 15th; this date would seem to indicate that it belonged to a second brood.

Sphinges and Bombyces:—*Macroglossa fuciformis*, L. (South's List), = *Hemaris tityus*, L. (Kirby, *ante*, p. 40). One larva, which pupated on August 20th; this seems rather late even for Scotland.—*Hylophila prasinana.* One larva.—*Spilosoma fuliginosa.* The larva of this moth appears to me to require food in the spring after hybernation, although they will spin up without any, and produce stunted specimens; on the other hand, *Bombyx rubi* certainly do not feed after hybernation.—*S. menthastri.* Fore wings always cream colour; never white.—*Orgyia antiqua, Bombyx callunæ.* Larva only common once, i. e. in 1893.—*B. rubi.* Larva always very common.—*Odonestis potatoria.* One imago and larvæ several times on the moors, but not at much elevation; Mr. King, in his list, also mentions this moth; but Mr. Barrett (Brit. Lep. vol. ii.) says of it, "apparently absent from Scotland."—*Drepana lacertinaria, D. furcula.* —*Notodonta dictæa.* Of a much whiter colour than South England specimens; just like those figured and described in Mr. Barrett's book as coming from Aberdeen.—*N. chaonia.* One specimen.

Noctuæ:—*Demas coryli.*—*Acronycta rumicis.* Scarce, all darkish.—*A. menyanthidis.* Larva often not uncommon on the moors, and feeding upon almost anything; I found that they generally died in pupa.—*Leucania comma.*—*Cœnobia rufa.* Often seen flying on the moors towards dusk.—*Hydrœcia nictitans.* Often to be found not uncommonly at rest on heads of ragwort, generally in a worn condition; they all seem to me to belong to the form which Mr. Tutt calls *lucens.*—*H. micacea.*—*Charæas graminis.* Not common.—*Apamea gemina.* –*Celæna haworthii.* Common on the moors; the species flies very swiftly in the afternoon.—*Stilbia anomala.* A few.—*Caradrina quadripunctata, Agrotis suffusa, Noctua baia, N. neglecta, Triphæna ianthina, T. fimbria.*—*Orthosia suspecta,* including the pale form.—*O. lota, O. macilenta.*—*Cerastis vaccinii.* Common.—*Scopelosoma satellitia.* Common.—*Xanthia fulvago* (*cerago*), *X. flavago* (*silago*), *X. circellaris* (*ferruginea*).—*Cirrhœdia xerampelina.* Two imagos, one of them at light; several pupæ, but all dead when dug up.—*Calymnia trapezina.*—*Polia chi.* I took a large number of this species one year in Kintyre, Argyllshire, and they were all quite typical; no sign of var. *olivacea* among them. *Epunda lutulenta* var. *luneburgensis*, one.—*E. nigra, Miselia oxyacanthæ, Agriopis aprilina, Aplecta occulta, Hadena adusta.*—*H. protea.* Very common, sometimes at sugar in the woods.—*H. oleracea, H. contigua, H. pisi.* Larvæ often on the moors; they seem to eat anything.—*Calocampa vetusta, C. exoleta, C. solidaginis, Gonoptera libatrix, Plusia interrogationis.*

Geometræ:—*Crocallis elinguaria.* Sometimes resting on the heather on the hills.—*Eugonia alniaria* (*tiliaria*). A very few at light in September, and once a female specimen on the moors on November 22nd.—*Himera pennaria, Amphidasys betularia.*—*Geometra papilionaria.* One specimen; it is not so fine a green as specimens from the South of England —*Iodis lactearia, Anisopteryx æscularia, Oporabia filigrammaria, O. dilutata, Larentia salicata, L. olivata, Eupithecia pulchellata. E. nanata.*—*Hypsipetes sordidata.* Some are very handsomely mottled with reddish brown and yellowish colour; mountain specimens are smaller than those taken in the woods by the sea.—*Melanthia bicolorata.* Rare.—*M. ocellata, Coremia designata.*—*Phibalapteryx lapidata.* Seen at three or four different spots; it flies considerably before dusk, and frequents places on the moor where there is plenty of grass and rushes; I have seen it at no more than 200 to 300 feet elevation.—*Cidaria prunata.*—*C. testata.* The females of the latter vary a good deal; I often took them resting on the heather.—*Epunda lichenea.* I reported this species from this locality in error (Entom. xxiv. p. 246).—W. M. CHRISTY; Watergate, Emsworth, Hants, July 17th, 1896.

PLUSIA MONETA IN SURREY.—I took a specimen of this moth flying at light on the 5th inst., at Sutton, Surrey. — A. J. ELDRED; London Hospital, E., July 7th, 1896.

On the 8th of this month I caught a very fine specimen of *Plusia moneta*, in a sitting-room opening into the garden, from which it was attracted by the light. I caught a specimen last August in this same garden, which I have already reported.— J. B. MORRIS; Malden House, Malden Road, Wallington, Surrey, July 10th, 1896.

Towards the end of May some friends found in their garden five bright yellow cocoons, attached to the under side of leaves of *Delphinium*, three of which were kindly given to me. These duly produced imagines of *P. moneta.* An empty cocoon was afterwards found in another garden. Altogether, with the above, no less than nine specimens of this species have now been found at Weybridge.—(Rev.) J. E. TARBAT The Common, Weybridge, July 15th, 1896.

PLUSIA MONETA IN KENT.—I have again found larvæ of *Plusia moneta* in my garden here, and have bred three splendid specimens, the last one emerging to-day, June 29th. — LEWIS F. HILL; 45, Freelands Road, Bromley, Kent.

Plusia moneta in East Berks.—This handsome moth has now become extremely common in the neighbourhood of Ascot. The food-plant, monkshood, is much grown in cottage gardens about here, and from the largest of a few clumps growing in our own garden I obtained a long series of the moth on the evening of June 28th, bottling them from the flowers by lantern-light, and scarcely using the net. More specimens, but worn, were to be seen on the two succeeding nights.—M. J. Mansfield; Hurstcroft, Ascot, July 1st.

Bombyx quercus ab.—In the spring of 1895 I collected a large number of larvæ of this species on the coast sandhills. Most produced moths the same season, but eleven pupæ remained over until this year; these have now emerged, and amongst them is a female having the base of each wing thickly covered with dark scales; but these rapidly decrease in quantity, thus appearing to form all round the outer margins a very broad band almost entirely devoid of scales, although the fringes are perfect and very distinct. Amongst the large number bred there is great variation in the depth of the ground colour: but the specimen specially referred to is totally different to anything I have seen, and altogether is a most striking and interesting specimen. — C. F. Johnson; 59, Lowfield Road, Stockport, July, 1896.

Sesia myopiformis.—On June 27th I caught in the garden here a perfect female of *S. myopiformis.*—H. W. Bell-Marley; Ravenscourt Park.

[Probably there is an old apple or pear tree in the garden where the insect was taken, or at least in one not far away. We used to obtain *S. myopiformis* freely from an old jargonelle pear-tree which grew in a garden near Regent's Park.—Ed.]

Thecla w-album at Reading.—On the 12th inst. I boxed a specimen of the above insect; it was settled on the flowers of bramble in a lane close to my house; I don't think think it has been taken within five miles of Reading before. Although I searched the lane I could not find another specimen, neither could I find the food-plant (wych elm).—W. E. Butler; Hayling House, Reading, July 19th, 1896.

Thecla w-album at Chalfont Road, Bucks.—Several of the members of the South London Entomological and Natural History Society who went down to this locality on Saturday, the 18th inst., had the satisfaction of taking this species. Unfortunately, however, the specimens were not all in the best possible condition. I have collected in the district, at the same time of year during several seasons, but never saw the species there before. I should note that I also saw a female specimen of *Argynnis paphia*, another species new to me for the district.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W., July 21st, 1896.

Vanessa c-album in Staffordshire. — A fine freshly emerged specimen of the above butterfly was taken here by my brother-in-law, Mr. J. R. B. Wasefield, in his garden, on July 11th.—E. W. H. Blagg; Cheadle, Staffordshire, July 21st, 1896.

Abundance of Chœrocampa porcellus.—No fewer than eighty or ninety specimens were taken at my home in Gloucestershire. So abundant were they that these specimens were picked specimens; all slightly worn were left to follow their own sweet will. Two *C. elpenor* were as nobles amongst a rabble. The last species is new to my list for Gloucestershire. —C. J. Nash; Pitnacree, Culver Road, Reading, July, 1896.

Lycæna arion in the Cotswolds.—I recently took a small series of this species in an unrecorded locality in the Cotswolds. The specimens are considerably larger than the average size of the type from the "Gloucestershire Alps."—W. Harcourt-Bath; June 29th, 1896.

SOCIETIES.

South London Entomological and Natural History Society.—*June* 25*th*, 1896.—R. South, Esq., F.E.S., President, in the chair. Mr. West, of Streatham, exhibited a bred series of *Hypsipetes ruberata*, containing uniform and banded specimens, and a specimen of *Trochilium crabroniformis*, bred from an osier-stem cut at Streatham in expectation of obtaining *Sesia formiciformis*. Mr. R. Adkin, a bred series of *Eupithecia venosata* from Hoy, with series from Shetland, Forres, and Isle of Man for comparison, and noted that the Orkney ones were of a browner shade, while the Isle of Man specimens were like South of England netted forms; also full-fed larvæ of *Calocampa vetusta* reared on dock from Inverness-shire ova. Mr. Barrett, a series of the rare *Osmylus chrysops* from Haslemere. Mr. South, types of the variation obtained from a brood of *Spilosoma menthastri* from Aberdeen. Several were smoky, one had dark fringes, in another the edges of all the black markings had run in appearance. Mr. McArthur, the five most remarkable forms of *Abraxas grossulariata* bred this year from some 3000 larvæ. In one the black external to the yellow band was almost entirely suffused; another was slightly smoky, and the spots had the appearance of having run; a third had the fore wings almost entirely black, with the outer half of the hind wings wholly black; another had the hind wings with a narrow black border, from the middle of which a wide streak ran into the centre of the wing. The smoky form was remarked as being very rare. Mr. Dennis, a series of *Cænonympha typhon* from N. Lancashire taken early in June. The specimens had very pure white markings underneath, referable to var. *rothlebi*. He also exhibited several very brilliant *Cyaniris argiolus* from Horsley, of a shade approaching that of *Polyommatus bellargus*. *Limenitis sibylla* was reported as out in the New Forest early in June.

July 9*th*.—C. G. Barrett, Esq., Vice-President, in the chair. Mr. R. Adkin exhibited a short bred series of *Dianthœcia nana* (*conspersa*), from larvæ taken in Hoy. They were all dark in colour, about midway between the Shetland and Scottish mainland forms. Also a series of *D. capsincola*, from the same locality, showing no variation from the usual English form. Mr. Auld, series of varieties of *Abraxas grossulariata* bred this year. One specimen was of an unusual form, the basal half of each wing being curiously streaked, while the outer half was quite normal. On the hind wings the streaks were very irregular in length. Mr. Turner, series and life-histories of the following species of *Coleophora*:—*C. lineolea* from Brockley and Lewisham, *C. albitarsella* from Lewisham, *C. palliatella* from Epping Forest, *C. lariciella* and *C. fuscedinella* from Carlisle. The latter species showed the young curved cases, which are abandoned early and new straight ones made. Also living pupæ of *Gonopteryx rhamni* from

Byfleet. Mr. Lucas, bred specimens and pupa-skins of the local dragonfly *Erythromma naias* from Byfleet. Mr. Enock, a living specimen of the very rare male of *Prestwichia aquatica*, which, with the assistance of Messrs. Dennis and Scarfield, he had discovered in a pond in Epping Forest. It had only the merest rudiments of wings. He much doubted the statement that the species was parasitic on the eggs of dragonflies. The ovipositor seemed too strong and too long. He suggested that the ova were deposited in some aquatic larvæ.—HY. J. TURNER, *Hon. Report Sec.*

NORTH LONDON NATURAL HISTORY SOCIETY.—On Friday, May 22nd, 1896, the Society started on their annual Whitsuntide excursion to the New Forest. Messrs. C. B. Smith, L. J. Tremayne, C. Nicholson, R. W. Robbins, and W. H. Smith left Waterloo by the usual 5.50 train, and arrived at Lyndhurst Road soon after 9 o'clock. Thence they proceeded by omnibus to Lyndhurst, and were comfortably settled in their rooms at Lynwood a little before 10 o'clock. The following morning was dry, but dull. All the members were out before breakfast. The fences only yielded a specimen of *Eupithecia vulgata*, a specimen of *Coremia ferrugata*, and a worn specimen of *Tæniocampa stabilis;* but a walk round Pond Head enclosure revealed the fact that larvæ, at any rate, were about in their usual numbers. Mr. Bacot turned up at breakfast time, and soon afterwards the whole party started out, taking the route down Beechen Lane. Larva-beating was immediately commenced, but only with moderate success. The quantity, indeed, was great, but the quality left much to be desired. All the Hybernias were common, *H. defoliaria* and *H. marginaria* being particularly plentiful. But the more satisfactory larvæ were, for the most part, scarce, and the following were beaten at various times throughout the trip:—*Psilura monacha* (one or two), *Eupithecia abbreviata* (one), *Himera pennaria* (common), *Asphalia ridens* (a few), *Brephos parthenias* (a few off birch), *Asphalia flavicornis* (a few off birch), *A. diluta* (a few off sallow), *Cleoceris viminalis* (a few off sallow), *Hypsipetes sordidata* (a few off sallow), *Thecla quercus* (two), *Catocala promissa* and *C. sponsa* (a few), *Tæniocampa miniosa* (in plenty off oak), *Amphipyra pyramidea* (a few), *Hylophila bicolorana* (one), *Cabera pusaria* (one), *Agriopis aprilina* (one). A notable absentee was *Amphidasys strataria;* whilst *Miselia oxyacanthæ* and *Diloba cæruleocephala* were also not in evidence. The day showed signs of becoming brighter, and a few butterflies appeared on the wing, including *Argynnis euphrosyne* and *Pararge egeria*, the latter in very fine condition, evidently the second brood just emerging. On turning into the pine woods, plenty of moths were found flying, mostly *Thera variata*, *Panagra petraria*, and *Venilia macularia*, though Mr. L. J. Tremayne took a specimen of *Drepana lacertinaria*, and Mr. C. Nicholson one of *D. falcataria* and one of *Cidaria suffumata*. The party worked on to the railway line in the hope of taking *Macroglossa fuciformis* (the narrow bordered hawk), but the *Alkanet* was mostly over, and the sun was not bright enough to induce these insects to fly. The party thereupon made a halt for lunch, obtaining a plentiful supply of milk from a cottage just across the line. After lunch, finding collecting decidedly slack, the party rested for an hour or so on the railway bank, except Mr. C. B. Smith, who worked further down the line. Eventually, the members, still without their President, turned towards home. The railway bank had yielded *Syrichthus malvæ*, *Nisoniades tages*, *Euclidia mi*, and *E. glyphica*, and one or two specimens of *Lycæna icarus* were also flying about. One specimen of *Thecla rubi* had also been taken by Mr. W. H. Smith during the day. The party worked back through Denny bog and wood, and on their arrival at Lynwood found Mr. Harvey awaiting them. The President did not appear till some time afterwards. He had, it appeared, been right up to the *lucina* ground, but failed to find that insect, the weather being much too dull, but had been rewarded by a couple of specimens of *Macroglossa fuciformis*, and one of *M. bombyliformis* (the broad-bordered species). After tea the party set out to sugar in Hurst Wood. Plenty of Geometræ flew at dusk, but these proved to be only *Larentia viridaria*, *Panagra petraria*, and other common kinds. Before the sugar was well laid on, rain began to fall, which it soon became evident had set in for the night. We soon had to return home, but not before it became obvious that not a single moth was coming to the sugar; and "assembling" with a specimen of *Eurymene dolobraria* obtained by Mr. Bacot in the afternoon was equally unprofitable. On Sunday morning Messrs. L. J. Tremayne and Bacot worked before breakfast in "Jones's" enclosure for the larvæ of *Limenitis sybilla*, but without result; and a search for the larvæ of *Argynnis paphia* in Beechen Lane was equally unsuccessful. After breakfast the whole party started for Rinefield, with the exception of Mr. Nicholson, who preferred to go for *Nemeobius lucina*. The day was fine and bright, and the members spent some little time on Butt's Lawn searching for *Thecla rubi*, but they were unsuccessful, though some fine specimens of *Phytometra viridaria*, *Ematurga atomaria*, and *Argynnis euphrosyne* were taken. They then turned into Hurst Wood, where hard beating produced about twenty larvæ of *Catocala promissa*. On emerging on to the heath between Hurst Wood and Vinney Ridge, the members were unable to resist the temptation of a dip in the Lymington river, after which they proceeded direct to Rinefield. Contrary to expectation, the rhododendrons were scarcely out at all, though the azaleas were in full bloom, and the latter afforded most of the attraction for the few insects that were on the wing. Although Mr. Harvey took a specimen of *M. bombyliformis* almost immediately on entering the avenue, scarcely any more were seen, and though the members remained on the ground for an hour or two, no success rewarded their patience. In the afternoon the party returned home *viâ* Vinney Ridge and Butt's Lawn. In the evening Messrs. L. J. Tremayne, R. W. Robbins, Harvey, and Bacot started to dusk at Matley. Going across the heath by the side of the Matley Road, they turned up a few specimens of *Scodiona belgiaria* at rest. Mr. L. J. Tremayne also took a specimen of *Drepana lacertinaria* flying. Dusking at the bog, however, again proved a failure, as, with the exception of some rather worn specimens of *Pachycnemia hippocastanaria*, nothing worth taking was netted. Subsequently the party returned across Whitemoor, and took a few more *Scodiona belgiaria*. The next day was spent by the members at Stubby Copse working for *Nemeobius lucina*, of which Mr. Nicholson had taken seven yesterday. Very moderate success, however, attended the North Londoners to-day, as, although there was plenty of sunshine, the species was only taken singly, and the numbers only reached about seven in all. Several other collectors were observed in the rather restricted localities to which this insect is confined, and it is feared that these may be getting somewhat worked out. There were plenty of insects on the wing, but nothing of any special note was taken. The members had to return to town the same evening. One or two larvæ of *Bombyx trifolii* were taken during the trip, but it is not thought advisable to give the exact locality.—Lawrence J. Tremayne, *Hon. Sec.*

Birmingham Entomological Society.—*June* 15*th*, 1896.—Mr. R. C. Bradley in the chair. Mr. J. W. Moore, 194, Stratford Road, Birmingham, was elected a member of the Society. Exhibits:—By Mr. J. T. Fountain, *Arctia villica*, bred, from Dawlish; *A. fuliginosa* var. *borealis*, bred, from Scotland, and other insects. By Mr. A. H. Martineau, three specimens of the very rare aculeate *Sapyga clavicornis* which he had recently taken at Solihull. He said that in rest the insect lays its big clubbed antennæ between its legs along the under side of his body, and quite out of sight, the clubs being turned upwards at the end. By Mr. C. J. Wainwright, a specimen of the rare *Doros conopseus* taken in Wyre Forest at Whitsuntide. He said it was probably the handsomest British dipteron. Also a specimen of *Polyommatus phlœas*, from Sutton, in which the colours and markings of the left wings both above and underneath were bleached, having the appearance of being rubbed, though the specimen was in good condition, with all its scales. Also a short series of *Hadena genistæ* from Wyre Forest. By Mr. R. C. Bradley, a specimen of *Spilosoma menthastri*, from Sutton, with very few spots on its wings; also a *Cucullia* bred from a larva found on the scabious at Barmouth, and which appeared to be *asteris*, but was unfortunately crippled; also a specimen of *Dioctria rufipes* with an ichneumon nearly as large as itself which it had captured.—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

Abstract of Proceedings of the South London Entomological and Natural History Society for the year 1895; together with the President's Address. Pp. 107. Published at the Society's Rooms, Hibernia Chambers, London Bridge, S.E.

We gladly welcome the appearance of this most interesting little publication. Although falling short of the volume for 1894 in the matter of pages, it compares very favourably therewith in the quantity of solid information that it contains. Among the papers is one on the variation of *Erebia æthiops* by Mr. Tutt, and this is a valuable contribution to our knowledge of the subject. The Report of the Council shows that the present effective strength of the Society is no less than one hundred and eighty members, and this fact, together with the further one that the substantial balance of nearly twenty-nine pounds remained in hand at the close of the financial year, are matters upon which we heartily congratulate the Society.

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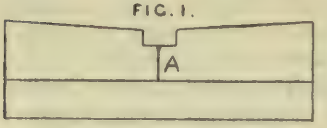
UNIFORMITY IN SETTING.

By J. H. Leech, B.A., F.L.S., &c.

Besides appearance, uniformity of setting facilitates the comparison of specimens to a very great extent. The methods I am about to refer to have been adopted in my own and other large collections both of British and foreign Lepidoptera, and I seldom introduce specimens from foreign sources into my collection without having them reset. The continental or flat style of setting has the following advantages over that usually practised in England:—The pins are of uniform length for all thicknesses; the specimens are well raised off the bottom of the drawer, so that there is less danger of their being attacked by mites, &c.; the wings are flat, and therefore in a better position for examination and comparison than when sloped and curved to different extents according to the fancy of the collector, or the maker of the setting-boards; the fringes also are not liable to damage through contact with the bottom of the drawer, which is so often the case with insects set in the English fashion. The advantages of flat setting have been recognized at the Natural History Museum for some years; and within the last year or so, the largest and most valuable collection of Lepidoptera in this country is being entirely reset.

In setting insects, the first thing to consider is the pin. There are many different sorts and sizes; the white and gilt varieties are, however, almost universally condemned, owing to their liability to verdigris and corrosion. My experience of the English black pins (speaking of some years ago) is that they are too soft, and the points very blunt. For some years I used an iron pin of foreign make enamelled black; this pin was not found satisfactory, as it was too soft, and the enamel was so bad that the pins when used in turf-lined drawers almost invariably rusted, owing to some ingredient in the turf. I then applied to Messrs. Kirby and Beard, and they made me a steel pin enamelled black. These have points like needles, and I failed to rust them, although I put them to several severe tests. I believe the only reasons they are not generally adopted is that they are not made in English sizes, and that they are rather expensive. The pin bill, however, is about the entomologist's smallest outlay, and hardly worth consideration. I would suggest that half a dozen prominent British entomologists should form a committee to examine this pin, and, if found satisfactory, decide on the best length for the usual English cabinet drawer. The height at which insects are to be pinned could also be determined by the same committee, as suggested by Mr. Searancke (*ante*, p. 231), and setting-boards made accordingly.

FIG. 1.



Boards (for the high flat style) should be made of soft wood from half to three-quarters of an inch thick. As the wings of most Lepidoptera have a tendency to droop when taken off the boards, this is obviated by a slight upward slope of the board from the centre; the correct angle has only been arrived at by considerable trouble. Fig. 1 shows the end view of setting-board; the groove in the centre receives the body of the insect, and the pin having to pass through a narrow opening, A, between the groove and the cork, is prevented from leaning to either side. Fig. 2 represents the side of setting-board with cork below the narrow opening referred to; another strip of wood could be added, as indicated by the dotted line, to keep the pins at a uniform depth. These boards are made by Mr. J. Crockett, Prince's Street, Cavendish Square, both for continental and English setting. A quantity of glass-headed steel pins and some glazed tracing cloth cut into strips will be required. Take the specimen to be set between the thumb and first finger of the left hand, and drive the pin through the centre of the thorax perpendicularly to the plane of the wings. Place the body of the insect in the groove, and drive the pin through the narrow opening and the cork to the required depth. As before explained, the pin can have no lateral inclination, so it is only necessary to see that it does not lean forwards or backwards. Care must be taken that the wings lie easily on the board, and that the body is neither too much elevated or depressed. Next take two strips of tracing cloth, glazed side downwards, and pin them on at the end of each side of the setting-board, as shown in fig. 3. The tracing cloth must be wide enough to cover the wings with the exception of a small portion of the base. Pass the cloth over the wings, pressing it slightly with the fingers of the left hand while the wings are raised into position with the setting-needle from the uncovered base; a pin can be inserted below the fore wing while the hind wing is being brought into position, but when this has been done and another pin inserted to keep it in place, as shown in the diagram, the first pin can be removed; additional pins are required to keep the legs and antennæ in place, and sometimes to hold up the body. To set the next specimen all that is required is to turn back the tracing cloth and repeat the process. Now the important point of uniformity in the position of the wings is, I believe, only to be arrived at in one way, that is, to draw an imaginary line following the inner margins of the fore wings and passing through the pin in the thorax, as shown in fig. 3, A, A. This will be found to produce the best results in the majority of Lepidoptera.

FIG. 2.

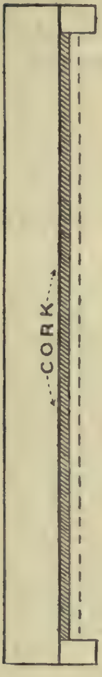
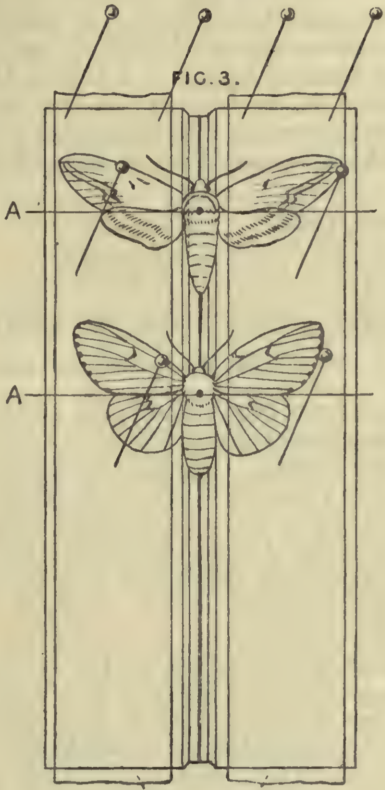


FIG. 3.



I may mention in conclusion that setting-boards should on no account be covered with papered cork, as the pin-holes leave a roughness which is a disadvantage in raising the wings into place. Before using the tracing cloth a second time, it should be pulled across the back of a knife to remove the roughness of the pin-holes. The object of using glass-headed steel pins is to penetrate the wood, and the round glass head saves the soreness to the finger caused by ordinary pins when much work has to be done. The above described method can be equally applied to the English form of setting. I believe that tracing cloth and glass-headed pins, as adjuncts in the setting of Lepidoptera, were both introduced by that inimitable setter Mr. Arthur Cant, who has probably operated on as many Lepidoptera as anyone living.

Iford Manor, Lewes.

ON SEASONAL DIMORPHISM IN BRITISH BUTTERFLIES.

By W. Harcourt-Bath.

For some time past I have paid particular attention to the seasonal dimorphism of our British Rhopalocera and the accompanying phenomena. I therefore perhaps may be excused in ventilating my views respecting a certain point connected with this subject which I wish to bring before the notice of the readers of the 'Entomologist,' and that is the influence of the climatal conditions in deciding the morphological characters. I will first take the three common species of *Pieris* in order to illustrate what I have to say.

The seasonal characters of *Pieris brassicæ*, *P. rapæ*, and *P. napi* are undoubtedly familiar to every entomologist. Those of the first brood are so distinct from those of the second that there could be no mistaking to which generation they belonged, even by a tyro. These characters I have, however, observed are subject to considerable modification or variation each season according to the prevailing climatic conditions of the particular year, namely the temperature and the amount of precipitation, the two phenomena being generally intimately connected with each other.

As a general rule, I find that the earliest emergences of the first generation in the spring partake of the distinctive or more pronounced characters of the first brood to the greatest degree. Those which emerge from the chrysalis state later assume more of the characters of the second brood in accordance with the increase of temperature which pertains a month or so more advanced in the season. These earlier emergences are smaller sized specimens than those which follow, and the black spots and markings are in addition more obscure,—in the males, indeed, being frequently almost entirely obliterated. When reared through the winter indoors, where the temperature is higher than that of the outside, the specimens of the spring brood assume more of the character of those of the second or summer generation. This is especially noticeable as regards *Pieris brassicæ*, specimens of which both in size and intensity of markings resemble very closely those of the summer brood, so that it is really difficult to distinguish them with certainty. *Pieris rapæ* does not seem to be so similarly affected as regards size, but the markings are generally more distinct; and in the female an ochreous tinge is frequently visible, this being one of the characters which females of the second generation often assume, especially in hot summers, and has been more frequently observed by me upon the Continent than in this country.

Now, as regards the summer broods of these three butterflies. I find the distinctive characters of these similarly affected in accordance with the temperature prevailing at the time or just preceding that of their emergence. In very wet seasons, when the temperature is as a consequence low, the butterflies partake more of the characters of the spring emergence; and this is particularly the case with *Pieris napi*, the under sides of the wings being more strongly veined and clothed with dusky spots than those of the typical summer specimens. I have indeed found specimens of all three species in July which could not be distinguished at all from typical specimens of the spring brood, but whether these are only late emergences of the first generation or not, I am at present unprepared to say. In hot summers, on the other hand, the distinctive characters of the second broods become much more intensified. These manifest themselves in the darker markings on the upper side and in the lighter colouring upon the under side of the wings; this latter appearance being due in large measure to the diminution in the number of dusky scales. In very fine hot summers, when third broods are able to make their appearance, these characters make themselves more prominent still, and the size of the specimens in addition undergoes an increase, as the series in my own collection amply testify.

What conclusions are we able to draw from these facts? They seem to be due to the indirect influence of the temperature upon the chrysalis, in accordance with the views of Weismann, and this in the *latter* stage of its existence. Whether they were originally produced by temperature it is difficult to decide; but if one may be permitted to judge from the more recent of the chameleon-like theories advanced by the learned Professor abovenamed, the seasonal characters have been rendered permanent by means of natural selection for protective purposes,—if I may employ a metaphorical expression,—the assistance of the climate, that is, the temperature of the season, bringing into activity those particular germs which will enable the perfect insect to assume morphological characters in harmony with the surroundings.

In addition to the seasonal dimorphism of the above three species of *Pieris*, another British butterfly has absorbed a good deal of my attention. I refer to *Vanessa c-album*. In ordinary seasons the light form of this insect, which I have named *lutescens* (*ante*, p. 257), appears in this country only as an aberration of the type of the first brood. The number, however, which appear each season in proportion to the type varies entirely according to the temperature. In exceptionally wet, cold seasons I have thus experienced considerable difficulty in procuring a single specimen of the light form, although those of the dark were not of uncommon occurrence. It is the males which seem to be more affected by the cold and wet, judging from the relative proportions of the two sexes in the variety *lutescens* whenever adverse climatic conditions prevail. The males are similarly less affected by a higher temperature. This season, which has been singularly fine and warm, has been the means of producing the variety *lutescens* in abundance. I have, in fact, taken over thirty of it, but not a single specimen of the type, so that what is in the great majority of seasons only an aberration of the first generation has occurred this year as the type of that brood, as is the case upon the Continent—at least in the centre and the south—every season.

My hypothesis concerning this butterfly—and the facts seem strongly to support it—is that what constitutes the second brood of *Vanessa c-album* in Europe at the present day formerly occurred as the only generation, perhaps shortly after the termination of the glacial period, but that more favourable climatic conditions existing now enable the butterfly to perform its metamorphoses in a shorter period, and thus to make two appearances in the same year instead of only one. The first brood existing now is therefore the most recent production, and the light form of the butterfly in consequence the most highly specialised of the two.

Birmingham, August, 1896.

SILK-PRODUCING LEPIDOPTERA.

By Alfred Wailly.

(Membre Lauréat de la Société Nationale d'Acclimatation de France.)

(Continued from p. 239.)

Bombyx (*Theophila*) sherwilli, Moore. The moth of this species much resembles that of *B. huttoni*, but it is a little larger. All that is known of it is that the perfect insect was found in the collection of Major J. L. Sherwill; it is not known whether it was captured in the plains or at Darjeeling.

Bombyx (*Ocinara*) religiosæ, Helfer.—"Although bearing the generic name of *Bombyx*, the description given by Dr. Helfer applies rather to a species of *Ocinara*. Dr. Helfer calls it the Goree silkworm; and Mr. Hugon, Deomooga silkworm. It is said to be found between Assam and Sylhet."—Capt. Hutton.

In his report on 'Silk in Assam,' dated February 29th, 1884, Mr. E. Stack, Director of Agriculture, speaks as follows respecting this species:—"This silkworm (*Bombyx religiosæ*) is called Deomuga on account of its large size. It is the largest of all silkworms; it attains a length of six and one-half inches; it is also the handsomest." Mr. Buckingham speaks of it thus:—"This silkworm lives on the sum (*Machilus odoratissima*), sometimes with the common Muga. In the second and third stages it is of remarkable beauty, with rows of turquoise blue on the sides. In the fourth stage the blue spots disappear and golden yellow spots replace them. On each side of the body there are bands or stripes of all the colours of the rainbow, which make this silkworm by far superior to all others in beauty." The Deomuga lives, it is said, thirty days, and spins its cocoon in three days. The moth emerges at the end of fifteen days in hot weather, and at the end of thirty days during the cold season; the moth lives four days. The cocoon is large (3 in. by 1½ in.); it produces a large quantity of strong and coarse silk. The thread of the Deomuga is employed in Bengal to make fishing lines. At Cachar the Deomuga lives on *Ficus indica*, and on the Pipal (*Ficus religiosa*). It is found generally in the valley of Assam.

Ocinara lida, Moore. This species is found in Mussoorie. The larva, which resembles that of a geometer, lives on *Ficus venosa* and the wild fig tree. It spins a small white cocoon on a leaf or on a stone at the foot of the tree; the cocoon is too small to be of any utility.—Capt. Hutton.

Ocinara lactea, Hutton. This species is also found at Mussoorie, and it lives on *Ficus venosa*, spinning in a leaf a small and curious yellow cocoon which is surrounded by a yellow silk net-work. The larva is smooth, whilst that of *O. lida* is hairy.—Capt Hutton.

Ocinara comma, Hutton. The moth of this species is white, with a dark mark having the shape of a comma on the disc of the four wings. It is found in the Doon, at about 5500 feet above Mussoorie.

Trilocha varians, Moore. A small species, discovered at Canara, and by M. Grote at Calcutta. It is useless as a silkworm.

Rhodia newara. A very interesting species, with a curiously shaped cocoon, which is green. The larva feeds on weeping willow.

Rhodia fugax. A species from Japan, similar to *Rhodia newara* but somewhat smaller. Feeds on all species of *Salix*. Easily reared last year by me and several of my correspondents on the Continent. The larva, like that of *newara*, hybernates in the ovum state. A peculiarity of the *fugax* larva is that it squeaks when touched, or even if it is slightly disturbed.

CRICULA TRIFENESTRATA. This curious species is found in various parts of India, sometimes in such large numbers that the larvæ completely strip the mango trees of their foliage; they also destroy the foliage of *Acacia catechu*, and even attack the tea trees. It is found in Burmah, Moulmein, and at Chota Nagpore in Central India. The cocoons are in large bundles, and they adhere so firmly to one another that they cannot be separated to be spun, which their structure besides would not allow; therefore they are carded. They are perforated like network, and are of a golden yellow colour. I made this species known in Europe in 1884, and the larvæ were reared with the greatest success. I bred them on oak, plum, apple, pear, and willow trees, and later on plum exclusively; they are very polyphagous.

In Mr. Stack's report the following is said respecting this species:—"Amluri or Ampotoni (*Cricula trifenestrata*).—The Amluri takes its name from the mango tree or Am on which it feeds. It is one of the most common in Assam. It is found in the valley at the foot of the hills on the northern and on the southern side. It is also found at Gachar, where it feeds on the wild tea tree. It is also frequently found on the sum; but its favourite food is the mango tree of the forests or that cultivated near the villages. The chrysalis, like those of all species of silkworms, is eaten, and is considered as a great delicacy by the Kacharis, the Rabbas, the Meches, and the Mikirs. The Rev. F. Camboué has also stated, in his reports on the Madagascar silkworms, that 'some of the natives (the Malgaches) eat with delight silkworm chrysalides, which they fry in fat.'"

During several years I received from the late Dr. John Shortt, of Yercaud, in the Shevaroy Hills, Madras Presidency, large numbers of *Cricula trifenestrata* cocoons; but the great difficulty has also been to receive the pupæ alive, as the moths for the most part emerged in transit about three weeks after the formation of the cocoons.

I may here state that, after several years of experience, I found that if pupæ sent from hot countries are considerably delayed in producing their moths in consequence of a great change of climate, the moths, although the pairings take place, and they seem perfectly healthy, lay eggs that are not fertile, as a rule. Being months instead of weeks before they emerge, the moths of tropical regions seem to have lost their vitality and power of reproduction. Besides, a considerable number of these tropical species die in the pupa state, when the heat is not sufficient to allow the moths to emerge at the very time they are ready to make their appearance.

The *Cricula trifenestrata* cocoons were between five and six weeks on the voyage from Yercaud to London. In about three weeks after their departure the moths commenced to emerge in large quantities, but some died after the arrival of the cases in London. The cocoons which had not hatched in transit died, or did not produce the moths till some time later on; hence the difficulty of obtaining fertile ova of this and other tropical species.

CALIGULA SIMLA, Westwood. The cocoon of this species, in the form of a net-work, resembles in shape that of *Cricula trifenestrata*, but it is larger and of a dark colour, almost black. Some years ago, in 1878 I think, I received cocoons of this species; but all the chrysalides which could be seen moving through the perforated cocoon died some time after. It is found in Simla, at Mussoorie, and in the province of Kumaon, feeding on walnut, *Salix babylonica*, wild pear tree, &c. A similar species is found in Japan, where it feeds on the chestnut tree. This Japanese species is *Caligula japonica*.

CALIGULA THIBETA. Is found at Mussoorie, where it lives on *Andromeda ovalifolia*, wild pear tree, and quince. It is also found in the province of Kumaon. Its specific name is wrong, as the insect never approaches Thibet. The cocoon is coarse, and of a similar texture to that of *C. simla*.

NEORIS HUTTONI, Moore. A species discovered by Capt. Hutton at Mussoorie, at about 6500 feet elevation, living on wild pear. The larvæ are found in April. The cocoon is a net-work, and its silk of no use.

ATTACUS RICINI. The worm of this species produces the silk known to the natives by the name of Arrindy silk. It is reared on the castor-oil plant (*Ricinus communis*). The principal places where this species is cultivated are Assam, East Bengal, Rungpore, and Dinagepore. The Mekirs, in the eastern part of Bengal, possess a very fine race producing white silk. *Attacus ricini* (*Bombyx arrindia*) according to certain sericiculturists, is no other than *Attacus cynthia* reared on *Ricinus* in a state of domesticity. It is in Assam that this species is almost exclusively cultivated, and, like the mulberry silkworm, it is also cultivated in a state of domesticity, and bears the name of Eri, a word which means *Ricinus*. The species lives also on the Keseru (*Heteropenex fragrans*); there are also several other trees, such as the Gulancha (*Jatropha curcas*), the Gamari (*Gmelina arborea*), and even, it is said, the Bogri or Ber (*Zizyphus jujuba*), on which the worm can be reared if the *Ricinus* happens to fail. Several times live cocoons of *Attacus ricini* were sent to me from Assam tied to a string placed across the box. The moths emerged so rapidly during the voyage that sometimes they paired, laid their eggs, and the young larvæ were found dead and dried up in the box.

ACTIAS SELENE. A species spread over India and the Island of Ceylon. The cocoon is closed, but irregular in shape, and it produces but little silk. There are, however, some races, like the Madras race, with a thick and firm cocoon, the silk of which has, it is said, been wound. The moth, which is remarkable for its beauty, is green, and has the shape of a long-tailed *Papilio*, like *P. podalirius* of Europe, and *P. ajax* of North America. The larva can be easily bred on walnut; it lives also on wild cherry. In India it lives on wild pear tree, hazel nut, *Cedrela paniculata*, *Coriara nepalensis*, and several other forest trees and shrubs.

ACTIAS MŒNAS, Doubleday. A species found at Darjeeling and in Assam; it is a larger species than *selene*, and the moth is of a bright ochre yellow.

ACTIAS LETO. This is found in the same localities as the preceding species, and there is now no doubt that *mœnas* and *leto* are one and the same species: *mœnas* is the female and *leto* the male. The wings of *leto* are yellow, but are covered with brownish pink blotches, which are wanting in the female *mœnas*.

SATURNIA PYRETORUM. Is found at Darjeeling and Cachar. Nothing more is known of this species.—Capt. Hutton.

SATURNIA GROTEI, Moore. Found at Darjeeling. One or two moths were also captured at Mussoorie. Captain Hutton thinks the larva lives on wild pear.

SATURNIA LINDIA, Moore. All that is known of this species is that it was found in a collection made by the late Captain James Lind Sherwill, and it is supposed it came from Darjeeling or its environs; it is allied to *S. grotei*.—Capt. Hutton.

SATURNIA CIDOSA, Moore. In the collection of Capt. J. L. Sherwill, and found in the north-east of India. We have no information respecting this species. As it is closely allied to *S. pyretorum*, I am inclined to believe that its habitat is Darjeeling or Cachar.—Capt. Hutton.

LŒPA KATINKA, Westwood. The yellow moth of this species is of remarkable beauty, and it was discovered for the first time in Assam; it is also found, I think, at Mussoorie. A small quantity of silk can be obtained from the cocoon.—Capt. Hutton.

LŒPA SAVALICA, Hutton. A species closely allied to the preceding one; it is found at Mussoorie, at 5500 feet, and also at a lower altitude. The cocoon produces a small quantity of silk.—Capt. Hutton.

LŒPA MIRANDA, Atkinson. A fine species, discovered at Darjeeling by Mr. Atkinson, but no other information is given.—Capt. Hutton.

LŒPA SIKKIMENSIS, Atkinson. A very fine species, discovered at Darjeeling by Mr. Atkinson. It can be distinguished from the other species by its small size, and its wings, which are spotted with maroon. Nothing is known of its economy.—Capt. Hutton.

ATTACUS ATLAS, Linn. The largest of the silk-producing

Bombyces; common at Mussoorie, at an elevation of 5500 feet, and in the Dehra Doon; it is also found in the deep valleys of the surrounding hills; common also at Almorah, where the worm lives on the Kilmorah or *Berberis asiatica*, whilst at Mussoorie it never attacks that shrub, and lives exclusively on the foliage of *Falconia insignis*. The worm of this species is probably easier to rear than all the other species of wild Bombyces. It produces a very large cocoon, which is rich in silk, and of a greyish colour. *Attacus atlas* is also common at Cachar, in Sylhet, at Akyab, in Arrachan, and in China (note o Capt. Hutton). It is spread all over India, the Island of Ceylon, China, Burmah, and other parts as far as Singapore at the extremity of the Malay Peninsula; it is also found at Java, Borneo, and probably in all the other islands of the Indian Ocean. The different races vary in size and colour; the cocoons also vary in size and colour. The larva is polyphagous. In Ceylon it is said to prefer cinnamon (*Laurus cinnamomum*) and *Milnea roxburghiana*, but it is found also on many other trees. In Europe it has been bred on barberry (*Berberis vulgaris*); it can also be bred on apple, willow, hornbeam, and other trees and shrubs. In 1881, I bred it in London on Ailanthus in the open air till the third stage. It could not be reared in the open air till the formation of the cocoon, except in southern parts. It can be reared in captivity, but not so easily as the note of Captain Hutton would lead one to suppose. The larva of *Attacus atlas*, like that of *A. cynthia*, is entirely covered with a secretion forming a kind of white flour, which can be easily rubbed off. *Attacus atlas* and *A. cynthia* have some features of resemblance, and the larvæ have been found living together on barberry in the province of Kumaon.

Attacus edwardsii, Moore. A dark race of *atlas* discovered at Darjeeling.

(To be continued.)

NOTES ON THE SYNONYMY OF NOCTUID MOTHS.

By Arthur G. Butler, Ph.D., F.L.S., &c.

(Continued from p. 257.)

Zethes, *Ramb.*

Z. quatiens, Walk., is an *Ephyrodes*; *Z. xylochroma*, Walk., is a true *Zethes*, but identical with *Marmorinia shivula*, Guen.

Zethes hesperioides.

Zethes hesperioides, Guenée, Noct. 3, p. 330, n. 1795 (1852).
Z. hæsitans, Walker, Lep. Het. xv. p. 1524, n. 4 (1858).

Z. umbrifera, Swinhoe, Trans. Ent. Soc. 1890, p. 253, n. 461. Java and Burmah. Types in Coll. B. M.

Section SARACA, *Walk.*

Zethes perturbans.

Zethes perturbans, Walker, Lep. Het. xv. p. 1525, n. 6 (1858).
Egnasia trimantesalis, Walker, *l. c.*, xvi. p. 220, n. 6 (1858).
Silhet, Japan, Chusan Island. Types in Coll. B. M.

Deva? inornata, Walk., belongs to this section of *Zethes*.

PANGRAPTA, *Hübn.*

Pangrapta decoralis.

Pangrapta decoralis, Hübner, Exot. Zutr. p. 18, n. 46, figs. 91, 92.
Marmorinia epionoides, Guenée, Noct. 3, p. 371, n. 1853 (1852).
M. geometroides, Guenée, *l. c.*, n. 1854 (1852).
Pangrapta elegantalis, Fitch (*teste* Grote, Check-List, p. 42).
Thyridospila recusans, Walker, Lep. Het. Suppl. 3, p. 1970 (1866).
Georgia, New York, &c. In Coll. B. M.

Guenée and Walker were quite ignorant of Hübner's description and figure of this species; the former founding his genus *Marmorinia* for the reception of two Indian species, one of which (*M. shivula*) is a typical *Zethes* = *Z. xylochroma*, Walk., and two varieties of *Pangrapta decoralis*.

The allied genus *Egnasia* differs chiefly in its simple antennæ; two synonyms may be recorded, viz.:—*Egnasia caduca*, Swinh., from Poona, is a female of *E. accingalis*, Walk.; and *E. euphrona*, Swinh., also from Poona, is a small example of *E. participalis*, Walk. *Thyridospila? vicaria*, Walk., from Congo, belongs to *Egnasia*.

DAGASSA, *Walk.*

This genus includes *D. eupithecioides*, Walk., *D. juruana* and *D. vulgaris*, Butl., *D. marginata*, Warr., *Apphadana liturata*, Walk., and *Thermesia croceiceps*, Walk. All the species occur in South America.

EUTHERMESIA, gen. nov.

Antiblemma, Grote (not Hübner).

The type of Hübner's genus is a species from Java, with obliquely porrected palpi, having the third article acuminate; whereas in the present genus the palpi are angulated and compressed, the third article (excepting at the tip or distal extremity) broadly triangularly expanded at the back, by the addition of a dense crest of gradually lengthening scales. The pattern of the wings and the variability of the species are almost the same as in *Thermesia*.

Euthermesia inexacta.

Thermesia inexacta, Walker, *l. c.*, Suppl. 3, p. 1038 (1865).
T. funesta, Walker, *l. c.*, p. 1040 (1865).
T. alacris, Walker, *l. c.*, p. 1041 (1865).
T. conficita, Walker, *l. c.*, p. 1042 (1865).
T. saturata, Walker, *l. c.*, p. 1043 (1865).
T. adjuncta, Walker, *l. c.*, p. 1046 (1865).
Antiblemma canalis, Grote (see Check-List, p. 42, n. 1295).
North and South America. Types in Coll. B. M.

There is not the least question as to the identity of the above supposed species, in all of which the same pattern is repeated, with variations of ground tint, greater or less definition in markings, and white, yellow, or black reniform spot; the most dissimilar forms occur together. The above synonymy will probably have to be increased when the Saundersian types are known. *Renodes latirena*, Guenée, may be also this species.

ISOGONA, *Guen.*

Massava, Walk., and *Eutoreuma*, Grote.

Isogona natatrix.

♂ *Isogona natatrix*, Guenée, Noct. 3, p. 323, n. 1786 (1852).
♀ *I. continua*, Guenée, *l. c.*, n. 1787 (1852).
♀ *Massava scissa*, Walker, Lep. Het. Suppl. 3, p. 1110 (1865).
♀. *Eutoreuma tenuis*, Grote (see Check-List, p. 41, n. 1291).
♂, ♀. North and South America. In Coll. B. M.

Walker describes his *M. scissa* as a male, but it is unquestionably a female. We have the male from Espiritu Sancto, Brazil. Grote's specimens are both females, a little smaller than the Southern examples, but not otherwise differing.

PLUSIA, *Ochs.*

Plusia ni.

Noctua ni, Hübner, Eur. Schmett. Noct. pl. 58, fig. 284.
Plusia humilis, Walker, Lep. Het. xii. p. 915, n. 61 (1857).
P. extrahens, Walker, *l. c.*, p. 929, n. 88 (1857).
P. significans, Walker, *l. c.*, p. 930, n. 89 (1857).

Europe, Punjab, Darmsala, Campbellpore, Chekiang, Japan, Aden, St. Vincent, St. Domingo. In Coll. B. M.

Grote quotes *P. brassicæ* of Riley as a synonym of this species, but it is far nearer to *P. u-aureum;* as a matter of fact, *P. labrosa* is much nearer to *P. ni* than *P. brassicæ* is, but the species are all quite distinct.

Plusia daubei.

Plusia daubei, Boisduval, Ind. Méth. p. 159, n. 1281; Duponchel, Suppl. 3, p. 486, pl. 42, fig. 1.
P. indicator, Walker, Lep. Het. xii. p. 922, n. 74 (1857).

P. ciliaris, Walker, *l. c.*, p. 928, n. 86 (1857).

Europe, India, and West Africa. In Coll. B. M.

Plusia argentifera.

Plusia argentifera, Guenée, Noct. 2, p. 352, n. 1186 (1852).

P. secundaria, Walker, Lep. Het. xii. p. 933, n. 95 (1857).

Australia and Tasmania. In Coll. B. M.

Walker selected a dwarfed male of this widely distributed and abundant Australian species as the type of his *P. secundaria*.

Plusia basigera, Walker, is *P. laticlavia*, Morrison; I do not know which name has priority.

Plusia agramma.

Plusia agramma, Guenée, Noct. 2, p. 327, n. 1136 (1852).

P. inchoata, Walker, Lep. Het. Suppl. 3, p. 841 (1865).

Java, Japan, Ceylon, Canara, and Australia. Types in Coll. B. M.

Plusia chrysitina.

Phalæna (*Noctua*) *chrysitina*, Martyn, Psyche, pl. 25, fig. 56 (1797).

Noctua aurifera, Hübner, Eur. Schmett. Noct. pl. 98, fig. 463.

Madras (*Martyn*), Asia, and Africa. In Coll. B. M.

P. orichalcea, Fabr., has been confounded with this species; it however differs in its slightly broader primaries, on which the brassy patch is decidedly broader, more regularly sinuated internally, and not produced nearly so far towards the base. This patch, therefore, answers more closely to the Fabrician description,—"anticæ macula lunari, orichalcea, nitida." His locality is "India"; we have it from the Nilgiris, Ceylon, and Japan. It stands between *P. chrysitina* and *P. chrysitis*.

Plusia chrysitis.

Phalæna chrysitis, Linnæus, Syst. Nat. x. p. 513.

Plusia nadeja, Oberthür, Etudes, 1880, p. 84, pl. 3, fig. 10.

Japan and Europe. In Coll. B. M.

M. Oberthür says that the metallic green in his species extends nearer to the base and farther towards the outer margin than in *P. chrysitis;* but these differences are not constant. Our brassy Japanese specimens bear out the second distinction, but the greener ones do not. As *P. chrysitis* varies more in the extent of the metallic area than in any of its allies, such differences have no weight as specific characters. Any lepidopterist who compares Russian and Japanese examples must be convinced at once that they are not distinct species.

Plusia festucæ.

Phalæna festucæ, Linnæus, Syst. Nat. x. p. 513.

Plusia putnami, Grote (see Check-List, p. 34, n. 847).

Europe, Japan, and United States. In Coll. B. M.

I fail to see any reason for separating American specimens from those of Europe; perhaps in a long series there may be more starved specimens from the States than from Europe, and the silvery subapical streak in the former is more frequently narrow than in the latter. The Japanese examples, as a fact, differ more, the metallic markings being larger and more prominent than in European specimens; but individuals differ quite as much from one another. Without constancy no distinction is worth consideration.

Plusia verruca.

Noctua verruca, Fabricius, Ent. Syst. 3, 2, p. 81, n. 238 (1794).

Plusia rutila, Walker, Lep. Het. Suppl. 3, p. 837 (1865).

United States, Jamaica, Venezuela, Bogota. In Coll. B. M.

It is highly probable that Walker's and Fabricius' types were from the same locality.

Plusia striatella, Grote, is *P. venusta*, Walk., but I do not know which name was first published.

Walker's (supposed European) specimens of *P. u-aureum* are undoubtedly *P. brassicæ*, Riley, and therefore have nothing in common with the true *P. u-aureum* of America. I must say I greatly doubt the original locality for the latter species, which is certainly not a variety of *P. interrogationis* as suggested by Dr. Staudinger, being more nearly allied to *P. octoscripta*.

Plusia bractea.

Phalæna bractea, Schiffermüller, Wien. Verz. p. 314.

Var. *Plusia excelsa*, Kretschmar, Berl. Ent. Zeit. 1862, p. 135, pl. 1, fig. 5.

Plusia metabractea, Butler, Trans. Ent. Soc. 1881, p. 190, n. 75.

Europe and Japan. In Coll. B. M.

With our present series I find it impossible to maintain the distinctness of *P. excelsa* = *metabractea* as a species. *Plusia octoscripta*, Sanborn, is *P. falcigera*, Walker, but certainly not Kirby's *P. falcifera*, which must be either *P. pasipheia* or an allied species; the description is so bad that nobody can possibly decide the point without seeing the type. *P. rectangula*, Kirby, is unquestionably Guenée's *P. simplex*, which it will supersede; it is quite evident that Kirby called the inner margin of the primaries *costal*, as describers of Micro-Lepidoptera at the present time call it *dorsal*.

Plusia ignea, Grote, is regarded by its author as a synonym of *P. alticola*, Walk. The species labelled as "*P. alticola*," and which therefore I presume to be *P. ignea*, is quite distinct from Walker's insect, which is more nearly allied to, though distinct from, *P. devergens*, and may (I think) prove to be the *P. devergens* of American lists. It differs from the European species in its much less strongly dentated submarginal line, wider central belt, and less oblique V-shaped central marking on primaries, and decidedly broader black marginal belt on secondaries. Grote's *P. alticola* = *ignea* is nearer to *P. hochenwarthi*, from which it chiefly differs in its much superior size.

Plusia virgula.

Plusia virgula, Blanchard, in Gay's 'Fauna Chilena,' vii. p. 84, n. 2 (1854).
P. certa, Walker, Lep. Het. xii. p. 920, n. 70 (1857).
Triphæna signata, Philippi, Linn. Ent. xvi. p. 293 (1860).
Chili. In Coll. B. M.

Mr. Hampson has pointed out to me that the genera *Risoba* and *Pitrasa*, hitherto placed near *Thyatira* (on account of their general resemblance to that genus), are actually Plusiidæ; *Risoba* will stand next to *Plusia*, which should terminate with *P. thyatiroides*; next to *Risoba* should come *Leptina*, followed by *Pitrasa* and *Plusidia*. The type of the last-mentioned genus is *P. abrostoloides* = *Plusia cheiranthi*, Tausch.

(To be continued.)

NOTES AND OBSERVATIONS.

Acherontia atropos: Notes on Larva.—The larva of this moth is unusually abundant here this year, and full-fed specimens were brought to me about the middle of July. In a garden near here it was noticed on the potatoes, and was feared as being probably an invasion of locusts! Five specimens brought to me from this garden illustrated three well-marked varieties, though the dimorphic dark form of the larva was not among them. Three of them belonged to the here usual greenish-yellow form with moderately distinct violet-purple oblique stripes. One, however, was a pure green variety with the stripes very faint, and at first sight reminded one of the privet hawk moth caterpillar. The third variety was very beautiful, being yellow, with the oblique stripes very extensive, definite, and deep-coloured. This individual exhibited a remarkable pecularity, inasmuch as on the second abdominal foot of the left side there was no trace whatever of any of the clasping hooks; the leg seemed in other respects quite normal, and all the other legs had their full complement of hooks, these structures being in this species numerous and large. This specimen had received some injury near the anus, and I am sorry to say was attacked with diarrhœa and died, so that I had no opportunity of ascertaining whether there might be a repair of the deficiency at the last moult, which possibly (but not certainly) had not taken place in this individual. While examining it after death (or after apparent death), when flaccid, discoloured, and shrunk to about half its normal size, and lying on its side on blotting-paper an apparent corpse, without reaction to pressure by my fingers, a house fly alighted on it and walked over it, whereon the skin was thrown into violent contraction; a striking instance of the independence of the life of parts of the insect organisation.—D. SHARP; August 1st, 1896.

TRIPHÆNA SUBSEQUA SPECIFICALLY DISTINCT FROM T. ORBONA.—Mr. Nash (*ante*, p. 262) asks, Is *Triphæna subsequa* in a true sense a distinct species from *T orbona?* The reason for his question apparently being a statement he makes that "A well-known local collector in the forest (*i.e.* the New Forest) told me that he had obtained ova from *subsequa*, and therefrom bred *subsequa* and *orbona* intermixed, pointing out at the time the specimens." I assume of course that the species intended are *subsequa*, Hb., and *orbona*, Fb., as the names are used in Doubleday's list, and without wishing for one moment to throw doubt upon the *bona fides* of this worthy collector, whoever he may be, I would venture to say that there is some great mistake here. That such mistakes will happen I know full well, having myself been the victim of one of a similar nature, which happened in this way. Some few years since, when both these species were occurring pretty freely at sugar, together with a sprinkling of *T. pronuba*, a collector, than whom I know no keener, sent me some ova labelled *subsequa*, together with a note saying that he was glad to be able to send me these ova, as I should see, as the larvæ grew, how very different they were from *orbona;* the eggs duly hatched, and the larvæ grew apace, and it was very soon apparent that they were not *subsequa*, but in due course produced a very fine lot of *pronuba*. The only explanation that I have ever been able to obtain is that "the *pronuba* eggs must have been in the box when the *subsequa* was put in it," and I suppose the latter did not lay. Is it not possible that something of this sort may have happened in the case of the New Forest brood? There can, I think, be no doubt as to the title of *subsequa* to specific rank; not only is the mark (the black spot on the costa) by which we are accustomed to distinguish it in the imago stage very constant, but, compared with *orbona*, the shape of the wings appears to me to be very different. In the larval stage the conspicuous ochreous dorsal line and accompanying rows of quadrangular black spots distinguish *subsequa* at once from the other more sombrely marked members of the genus.—ROBERT ADKIN; Lewisham, August, 1896.

PLUSIA CHRYSITIS: THE BANDED FORM.—Mr. Kane, in his useful and interesting Catalogue of the Lepidoptera of Ireland (*ante*, p. 213), falls into an error in his reference to this form of *P. chrysitis*. I take the banded form commonly enough about Chester, although not so frequently as the one usually regarded as the type, in which the median brown band of the primaries is more or less broken. Newman did not find the banded form rare, as will be seen from the following ('British Moths,' p. 452):—"Their colour" (fore wings) "is metallic golden-green, with a brown blotch at the base, another and larger brown blotch at the middle of the costal margin, and a third opposite this on the inner margin; in some of my specimens the costal and inner-marginal blotches unite in forming a median band."—J. ARKLE; 2, George Street, Chester.

Leucania straminea.—In Buckler's work on 'The Larvæ of British Butterflies and Moths' it is stated, with reference to the larvæ of this species, that a large proportion of them are generally ichneumoned. I cannot quote the exact words, as I have not the volume with me. But in June last I took sixty-four of the larvæ, which in due course spun up and changed to pupæ. Before leaving home to take part in the naval manœuvres, I had to cut the cocoons off the muslin and from the reed stems upon which they had spun up, and I only found two of them ichneumoned. These I sent to my friend Bignell, and the others, with the exception of two sent to another friend, I brought on board with me, and from these I bred fifty-eight perfect insects and two cripples. From this it would appear that the species, at any rate in the neighbourhood of Dovercourt, where the larvæ were taken, is singularly free from the attacks of parasites, and, moreover, is not a very delicate one, as some of the cocoons were rather roughly handled, and all had a deal of shaking about. May I here take the opportunity of informing many friends and correspondents that I have just been appointed to H.M.S. 'Hawke' on the Mediterranean station, and in consequence shall not be able to carry into effect many of the promises I made last season with respect to exchanges this. I am very sorry, and hope to be forgiven, but it cannot be helped.—Gervase F. Mathew; H.M.S. 'Apollo,' Sheerness, August 7th, 1896.

Enemies of Humble Bees.—I was much interested in Mr. W. W. Smith's note in the July number of the 'Entomologist' on the enemies of humble bees in New Zealand (*ante*, p. 210). Years ago, on the prairies of Illinois, I used frequently to see *Bombus vagans*, Smith, and *B virginicus*, Oliv., captured and killed by one, and I think two species of *Asilus*, but am at present unable to give the specific names of these. Doubtless *Bombus pennsylvanicus*, DeG., which is also common on these prairies, though a larger species, often meets the same fate. The flies pounce on their prey, and at the same instant thrust their stout beak into their victim. If the head of the bee is deeply immersed in a flower, the abdomen is punctured, but if the bee happens to be nearly or quite exposed, and especially if occupied with small blossoms situated on a vertical stalk, the thorax is pierced. In any case, the attack is followed so quickly by the thrust that the victim appears to die almost without a struggle, the captor generally sucking its juices before flying away. The *Asilus* are rather fearless, and with caution one may watch them in exposed situations engaged in their murderous work.—F. M. Webster; Ohio Agricultural Experiment Station, Wooster, Wayne County, Ohio, U.S.A., July 24th, 1896.

Collector v. Entomologist.—Some little time ago I noticed in the magazine some remarks which seemed to imply that no one was worthy of the name of entomologist who did not make his collecting entirely subservient to the elucidating of scientific problems. This seems to me somewhat rough upon the ordinary collector. It is not everyone who has the necessary aptitude or training for investigating the questions with which science deals, nor have many people the leisure for this purpose; but surely everyone can admire a beautiful object when he sees it, and it will be to him the more lovely when he has obtained it by his own exertions. Is it not then somewhat ungracious to discourage those whose only object is to obtain a more intimate knowledge of the external appearance of the wonders of creation, though they may not apply that knowledge to the deducing of general laws? As though one should say that a man ought not to form a collection of pictures, unless he can work out from them the true principles of painting; or to pick up shells on the shore, unless he can so clear up some problem in conchology. But even a "mere collector" may have his use, for may not his collection, properly labelled, form part of the basis on which the scientific superstructure may be raised by others? I make these few remarks in the hope that someone more competent than myself, perhaps the Editor in person, may say a word on behalf of the ordinary collector, which with some shamefacedness I must avow myself to be, and tell us whether he is indeed to be put down with scorn and derision, or may, as I hope, still have a brotherly hand extended to him by those of greater attainments, but perhaps of no greater love for entomology.—Rev. W. Claxton; Woolston, Southampton, August 4th, 1896. [As an entomologist is one who studies the habits, &c., of insects, and as a collector of insects, in order to obtain species, studies their habits and life-histories, it follows that a collector can justly claim to be an entomologist. Entomologists may be roughly divided into two classes—(*a*) the practical, (*b*) the scientific. Speaking in a general way, class *a*, which, by-the-bye, is far the largest, is to a very great extent quite independent of class *b;* whilst students in the latter class are often indebted for material to those who labour in the former. There is, however, no hard and fast boundary-line between the two classes; very many expert practical entomologists in this country are distinctly scientific in their work, and several eminent scientific entomologists are adepts at field work. As this subject has been brought forward, it is to be hoped that our readers will favour us with their views thereon.—Ed.]

Note on Polia xanthomista var. nigrocincta.—Is it usual for a portion of the ova of *P. nigrocincta* to hatch out in the autumn, and the rest remain over until the following spring? I have now been collecting many *nigrocincta* larvæ each season for more than twenty years. At the beginning of June, 1895, I took a fair quantity, full-fed, but was obliged to go away at the latter end of August for ten days. On my return, I found many of the moths had emerged, and spoiled themselves of course. Not thinking anything about ova until the end of November when I came to clear out the large flower-pot they had been in, I found to my astonishment, on the cloth covering the top of the pot, a quantity of eggs, a great portion of which had hatched, and the larvæ had disappeared. The rest I took great care of, and in the spring following the larvæ hatched out.—John Thorpe; Cheapside, Middleton, near Manchester, July 16th, 1896.

CAPTURES AND FIELD REPORTS.

Vanessa c-album in Salop.—Two specimens of *V. c-album* were taken in my garden on August 3rd.—(Rev.) Charles F. Thornewill; Calverhall Vicarage, Whitchurch, Salop, Aug. 17th, 1896.

Euchloë cardamines in August.—On August 2nd I saw a male specimen of *E. cardamines*, flying in Tiddington Lane, between Thame and Oxford. It appeared to have just emerged.—J. W. Shipp.

Acherontia atropos in Lincolnshire.—Five full-grown larvæ of *A. atropos* have been brought to me this year, and I have heard of others having been taken.—W. Lewington; Market Rasen, Aug. 14th, 1896.

Acherontia atropos in Herts.—On Aug. 4th I received a single larva of this species from a friend living at Elsenham, near Bishop Stortford.—F. Cornell; 14, Wellesley Road, Leytonstone, E.

Acherontia atropos in Co. Waterford, Ireland.—A specimen, or rather the remains of what was once a specimen, of *A. atropos* was brought me dead by the gardener to-day (Aug. 6th). It was taken at rest in a potato field near Ballindud a few days previously. Is not August an unusual month to meet with this insect?—L. H. Bonaparte-Wyse; Manor of St. John's, Waterford. [Unusual but not exceptional.—Ed.]

Acherontia atropos in Salop.—A full-grown larva of *A. atropos* was brought to me on Aug. 13th from a neighbouring village, where it was found crawling across a path, and is now safely ensconced under ground.—(Rev.) Charles F. Thornewill; Calverhall Vicarage, Whitchurch, Aug. 17th, 1896.

Coleoptera at Cirencester.—On August 3rd I took two specimens of *Ptilium affine* amongst rubbish in a garden at Cirencester. With them I also found *Ptenidium evanescens* and *Acritus minutus*.—J. W. Shipp.

Agrotis ashworthii.—On July 20th last I captured a specimen of this moth in the Sychnant Pass, between Conway and Dwygyfylchi. I should be glad to know if many specimens of this insect have been taken in recent years.—B. Harvey-Jellie, B.A.; 61, Tyrwhitt Road, St. John's, S.E., Aug. 15th, 1896.

[Mr. Tait (Entom. xxviii. 233) records the capture of eight specimens early in July, 1895. The species is probably bred each year from larvæ collected in the Penmaenmawr district.—Ed.]

Plusia moneta in Hertfordshire.—My brother and I took eight specimens of *P. moneta* near Tring, during the last week of June and the first week of July this year. They were hovering around and settling on the flowers of monkshood. Several were in splendid condition.—J. W. Shipp; August, 1896.

Plusia moneta in Kent.—Two specimens of *P. moneta* have been taken near here this July. One at Ashford, by Mr. Lewis, on a carnation blossom; and another, at light, near Wye.—F. V. Theobald, Wye, Kent.

Acronycta alni and Aplecta occulta in Lincolnshire.—I have beaten two larvæ of *Acronycta alni* this year; one at Hartsholme, near

Lincoln, Aug. 3rd, the other near Market Rasen, on the 12th of the same month. At sugar, on the night of Aug. 12th, I had the pleasure of taking a pair of *Aplecta occulta* for the first time in this locality.—W. Lewington; Market Rasen.

Parnassius apollo in the Pyrenees.—I am finding this handsome butterfly here in abundance, both on the French and the Spanish sides of the range. It occurs between the altitudes of 2000 and 6000 feet, which thus approximates very closely with its vertical distribution in the Alps, allowance being made for the difference of latitude.—W. Harcourt-Bath; St. Sauveur, Hautes-Pyrénées, July, 1896.

Aberrations of Argynnis paphia and Limenitis sibylla.—From June 29th to July 10th my brother and myself were collecting in the New Forest, and during that time we captured and saw most of the species mentioned by Mr. Nash (*ante*, p. 261). Among the *A. paphia* we took was an interesting variety of the male, in which the spots are confluent, forming a broad bar on fore and hind wings. We heard of several (about six) dark varieties of *L. sibylla* being taken. One male example of *Boarmia abietaria* was also secured, and a female specimen of *Lasiocampa quercifolia* was given to me by a boy, who had found it just emerged from the chrysalis.—F. L. Blathwayt; Bromyard, Aug. 4th, 1896.

Abundance of Chœrocampa porcellus.—Referring to the note by Mr. C. J. Nash on *C. porcellus* (*ante*, p. 264), I may say that the species has been most abundant here. On four nights I took on honeysuckle and valerian some fifty specimens, though not more than one-tenth were sufficiently good to kill. I generally get two to four specimens in the year, but this year I have no doubt if I had tried I could have netted two hundred easily, but I did not bother to take them when I found them so worn. The honeysuckle was not sufficiently out to visit till June 4th, when the majority of some fifteen specimens boxed were useless. I may add that I found two larvæ of this species, three-parts fed, on *Galium verum*, on the night of June 21st.—W. B. Thornhill; Castle Cosey, Castle Bellingham, Ireland, July 30th, 1896.

Notes from North Wales.—During a three weeks' visit to N. Wales, at the end of May and beginning of June, I found insects unusually plentiful. More than 160 different species of Macro-Lepidoptera were met with, although "sugaring," except at the sandhills, was very unproductive. The following are some of the species noticed:—*Pieris brassicæ*, *P. rapæ*, *P. napi*, all abundant.—*Euchloë cardamines*, plentiful.—*Argynnis selene*, plentiful at Tan-y-bwlch, Merionethshire, by May 30th.—*A. euphrosyne*, worn, May 24th.—*A. aglaia*, *A. adippe*, just beginning to appear at Barmouth, June 12th.—*Melitæa aurinia*, abundant in several localities near Tan-y-bwlch and Barmouth, quite fresh, May 26th; of about seventy specimens taken that day only two were females.—*V. urticæ*, *V. io*, larvæ of the former species very abundant; the first of a batch of larvæ of the latter taken at Barmouth pupated June 14th, and the first imago appeared July 9th.—*Pararge egeria*, a few taken at Barmouth.—*P. megæra*, very abundant.—*Satyrus semele*, just beginning to appear June 7th.—*Epinephele ianira*, plentiful.—*Cœnonympha typhon*, June 6th, abundant on a large bog near Tan-y-bwlch; the form I took is similar to *typhon* from the South of Scotland and from Ireland.—*C. pamphilus*, abundant.—*Thecla* *rubi*, generally distributed.—*Polyommatus phlœas*, abundant.—*Lycæna ægon*, abundant in one locality in Carnarvonshire by June 7th.—*L. icarus*, abundant.—*L. argiolus*, one worn specimen at Tan-y-bwlch, May 30th.—*Nemeobius lucina*, took three worn specimens, May 29th, two of them being only fit to be released again. My friend Mr. W. J. Kerr took me to a valley in Merionethshire where he met with this species many years ago, and it was pleasing to find it still in existence.—*Nisoniades tages*, abundant. —*Hesperia sylvanus*, very plentiful.—*Sphinx convolvuli*, I learnt from my friend Mr. Kerr that this insect was fairly numerous at Barmouth last autumn, he having taken several specimens at flowers of the tobacco-plant. —*Chœrocampa porcellus*, I saw one specimen at Barmouth, but failed to capture it.—*Macroglossa bombyliformis*, an insect more easily seen than taken; we captured ten specimens altogether, but they seem to spoil themselves very soon after emergence.—*Ino statices* occurred in many localities. —*Zygæna pilosellæ*, this interesting species was still plentiful in its old haunts where I had taken it in 1891 and 1893; my friend Mr. F. C. Woodforde was the first to find the cocoon, which is not exposed like that of *Z. filipendulæ*, but hidden away deep down amongst the stems of heather and grass, and sometimes fastened on to stones.—*Z. filipendulæ*, very plentiful; out by May 24th.—*Hylophila prasinana*, Tan-y-bwlch.—*Setina irrorella*, one at Tan-y-bwlch.—*Lithosia mesomella*, *Euchelia jacobææ*, *Nemeophila russula*, *N. plantaginis*, *Arctia caia*, *Spilosoma lubricipeda*, *S. menthastri*, *Hepialus humuli*, *H. velleda*, *H. lupulinus*, *H. hectus*, *Dasychira pudibunda*, Barmouth and Tan-y-bwlch.—*Cossus ligniperda*, one freshly-emerged female taken at sugar.—*Porthesia similis* and *Bombyx neustria*, larvæ very common. —*B. rubi*, *B. quercus*, *Odonestis potatoria*.—*Saturnia pavonia*, several broods of larvæ met with.—*Drepana falcataria*, *Cilix glaucata*, *Acronycta psi*.—*A. rumicis*, plentiful at sugar.—*Leucania lithargyria*.—*L. littoralis*, Barmouth. —*L. comma*, *L. pallens*.—*Axylia putris*, one taken at Barmouth by my friend Mr. Meynell.—*Xylophasia lithoxylea*.—*Mamestra albicolon*, plentiful at sugar at Barmouth.—*Miana strigilis*, *M. fasciuncula*.—*Grammesia trigrammica*, a fine variety, with suffused dark colouring on upper wings, taken at Barmouth.—*Caradrina morpheus*, *Rusina tenebrosa*.—*Agrotis vestigialis*, Barmouth.—*A. suffusa*, *A. corticea*.—*A. ripæ*, Barmouth.—*A. cursoria*, four at Barmouth.—*A. strigula*.—*Agrotis ashworthii*, from larvæ taken in Flint at the end of April the first imago appeared on June 17th; my friend Mr. Woodforde and I went to hunt for these larvæ April 27th to 29th, and found, contrary to what appears in the text-books, the larvæ feed freely and crawl about on their food-plants, rock cistus, &c., in the daytime, as well as at night. The traditional method of finding these larvæ by turning up stones is a very slow and tedious method of acquiring them. In captivity they feed freely on primrose and dandelion flowers, as well as on sallow catkins.—*Mania maura*, at sugar.—*Dianthœcia nana*, one wing in a spider's web.—*Hecatera serena*, one taken by Mr. Meynell.—*Aplecta advena*, one taken at sugar at Barmouth, and another seen.—*H. adusta*, abundant at Barmouth.—*H. oleracea*, *H. pisi*.—*H. contigua*, four at sugar at Barmouth.—*Cucullia umbratica*, abundant.—*Gonoptera libatrix*.—*Habrostola tripartita*, *H. triplasia*.—*Plusia festucæ*, *Anarta myrtilli*, *Heliaca tenebrata*, *Erastria fasciana*, *Bomolocha fontis*.—*Venilia macularia*, abundant and generally distributed.—*Eurymene dolobraria*, two at Tan-y-Bwlch.—*Selenia lunaria*, *Amphidasys betularia*, *Tephrosia crepuscularia*, *T. punctularia*, *Pseudoterpna pruinata*, *Iodis lactearia*.—*Acidalia contiguaria*, I took one specimen of this interesting little Geometer on June 7th in Carnarvonshire. —*A. marginepunctata*, *A. subsericeata*, *A. fumata*, *Bapta temerata.*—*Strenia clathrata*, Tan-y-Bwlch.—*Bupalus piniaria.*—*Larentia cæsiata*, taken on June 3rd: surely a very early date?—*Emmelesia albulata*, very abundant.—*E. decolorata*, *Eupithecia pulchellata*, *E. nanata*, *E. absinthiata*, *E. pumilata.*—*Lobophora viretata*, one at Tan-y-bwlch.—*Melanippe hastata*, *M. tristata*, *M. sociata*, *M. galiata.*—*Anaitis plagiata*, very plentiful.—*Tanagra atrata*, very plentiful at Barmouth.—*Ennychia cingulata*, very abundant.—*E. octomaculata*, plentiful on the railway line near Penrhyndeudraeth railway station; one or two seen in other places.—*Botys fuscalis*, plentiful. The above list will, I think, show that North Wales is by no means a bad collecting-ground for the entomologist.—E. W. H. Blagg Cheadle, Staffordshire, July 21st, 1896.

Early appearances of Lepidoptera in 1896.—I was in the Lake District this year from May 25th to June 8th, and found some species out unusually early. This was notably the case with *Cœnonympha davus* (*typhon*), of which I took several specimens on the Holker mosses on May 30th. The species was well out in the same locality on June 1st, and it simply swarmed at Witherslack on June 3rd, where in an hour and a quarter I captured and boxed sixty-seven specimens. On May 25th I found *Argynnis selene* well out near Lakeside, Windermere; and *A. euphrosyne*, males, were practically over, though the females were still in very good condition and extremely abundant. I took three nice pale varieties of this species. On May 28th I saw several *Zygæna filipendulæ* on the railway embankment at Grange, and on the same day took at Witherslack a nice series of *Procris geryon* and a few *Lycæna agestis* var. *salmacis.* This latter species was very abundant a week later. On May 30th *Hydrelia unca* was well out on the Holker mosses; and on June 1st and 3rd I obtained respectively *Aspilates strigillata* and *Acidalia fumata.* I took a number of other species, but their time of appearance was about normal.—B. H. Crabtree; The Oaklands, Levenshulme, Manchester, July 23rd, 1896.

SOCIETIES.

South London Entomological and Natural History Society.—*July* 23*rd*, 1896.—T. W. Hall, Esq., F.E.S., Vice-President, in the chair. Mr. West (Streatham) exhibited specimens of *Catocala promissa* and *C. sponsa*, bred from larvæ taken during the Society's field-meeting at Whitsuntide. Mr. Robt. Adkin, a bred series of a *Hypsipetes*, bred from larvæ taken in Orkney by Mr. McArthur. He was unable to say whether they were *H. trifasciata* or *H. ruberata*, although he was inclined to think they were referable to the latter species. He also exhibited a specimen of *Cœnonympha pamphilus*, with the row of ocelli on the under side very well developed, Mr. Dennis, a series of under sides of *Cupido minima*, taken at Horsley, showing a complete gradation in the number and development of the spots, and also one upper side well scaled with blue. Mr. Fremlin, specimens of *Polyommatus astrarche* var. *salmacis*, from Castle Eden Dene. Mr. Mansbridge, varieties of *Abraxas grossulariata*, bred from larvæ obtained at Horsforth. Out of 150 larvæ two or three per cent. only showed more than ordinary variation, compared with some fifteen per cent. last year from the same locality. Two specimens were asymmetrical, and one was a nicely radiate form. Mr. West (Greenwich) exhibited specimens of the hemipteron *Dicyphus epilobii*, from Eltham. Mr. Moore, a specimen of the second brood of *Cyaniris argiolus*, taken on July 12th, at Oxshot; and also a specimen of *Lycæna ægon*, destitute of the row of fulvous blotches on the upper surface, and one having confluent spots on the under side. Mr. Robt. Adkin contributed a paper entitled "Notes and Observations made during the Society's Field Meeting at Chalfont Road, on July 18th, 1896."

August 13*th*.—C. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. S. Stevens exhibited an unusually small specimen of *Papilio machaon*, having the black band on the hind wing very narrow. Mr. R. Adkin, a bred series of *Pachnobia hyberborea*, from pupæ taken at Rannoch. Mr. McArthur, a preserved larva of the same species, mounted on a twig of its food-plant (*Empetrum nigrum*), the crowberry, and gave interesting details as to its life-history. Mr. Fremlin, a series of *Phigalia pedaria*, from Saltash, including the dark reticulated form and the very dark uniform variety. Mr. H. Moore, numerous interesting insects from South Africa, including a fine specimen of *Actias mimosæ*, which from its sluggish habits can be easily picked off the bushes; its larvæ are more or less gregarious; several species of the larger Orthoptera, *Pachytilus pardalinus*, the species which often appears in vast numbers and does considerable damage; *P. peregrinus*, which is the locust of N. Africa; *Cyrtacantus purpurifera*, a very large species; *Acheta africana*, a mole-cricket from Johannesburg; and numerous species of Coleoptera which are attracted in thousands to the electric light in Pretoria. Mr. Sauze, a specimen of *Cicada anglica*, one of three taken by Mr. Heasley, in Surrey. Mr. Heasley had been attracted to some oak trees by an unusual stridulation, and eventually succeeded in obtaining these three examples. Thus a doubt as to whether this species stridulates or not has been cleared up, there being no previous record of such in this country. Mr. West, of Greenwich, a series of the local hemipteron, *Eurygaster maura*, from Folkestone. Mr. Mansbridge, a double cocoon of *Clisiocampa neustria*, from which, although the imagines had emerged from the pupa-cases, they had been unable to extricate themselves. When cut open there was only one cavity partially divided into two. Mr. Barrett exhibited four British specimens of *Plusia ni*, two belonging to Mr. Jeffries and two to Mr. Briggs; one of the former was captured in Surrey. Also a fine variety of *Cleoceris viminalis*, having the basal half of the fore wings very dark, in contrast to the very pale outer portion; and a remarkable form of *Agrotis exclamationis*, in which neither of the stigmata was developed, but the elbowed and basal lines were very distinct and perfect on the uniformly pale brown ground colour. A discussion took place on the season, with especial reference to *Colias edusa*, and the means of migration of insects, Messrs. Stevens, McArthur, Adkin, Barrett, Mansbridge, Winkley, and others, taking part.—Hy. J. Turner, *Hon. Report Sec.*

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SHOULD THE FORMATION AND ARRANGEMENT OF A COLLECTION OF INSECTS BE MADE SUBSERVIENT TO THE ELUCIDATION OF SCIENTIFIC PROBLEMS?

By W. Harcourt-Bath.

Our worthy Editor (*ante*, p. 287) invites correspondence on this subject in connection with the communication by the Rev. W. Claxton (*ante*, pp. 286, 287), which affords me an appropriate opportunity for airing my opinions respecting a theme which has for some time past interested me considerably, and provided me with much food for contemplation. First of all permit me to dissent from the views expressed by Mr. South, to the effect that a collector must necessarily be an entomologist because he is compelled to learn something about the habits and economy of the insects for which he seeks. He may be no more an entomologist than a mere postage-stamp enthusiast can claim to be a geographer, although the latter, in the course of compiling his collection, in a similar manner manages to acquire a little knowledge about the various countries which issue those articles. Both find it to their advantage to learn as much as possible about the objects of their affections, but only of such a nature as shall assist them directly in their acquisition; and in many cases the information so obtained, as a necessary consequence, is not appreciated for its scientific interest at all.

It is, however, I must admit, a difficult matter to decide what is the real distinction between an entomologist and a "mere collector"; there are as many grades merging one into the other as is the case in many species of Lepidoptera and their varieties. An entomologist is almost as difficult to define as is a species. Anyhow, if a person desires to consider himself as belonging to the superior fraternity, I do not see logically how he can possibly share the opinion of the Rev. W. Claxton, but must rather coincide with that expressed by the correspondent whom this gentleman condemns as implying that "no one was worthy of the name of entomologist who did not make his collecting entirely subservient to the elucidating of scientific problems."

During the greater part of my career as a collector of insects I must candidly confess that I have taken very little interest indeed in the great biological problems which are absorbing the attention of savants at the present day, such as A. R. Wallace, August Weismann, and many others. My collecting was formerly wholly undertaken in the old-fashioned style such as reigned supreme before Charles Darwin launched his well-known theories upon the world, and H. W. Bates had invented that wonderful theory of mimicry. It is only within the last two or three years that I have awakened to the advantage of a different course of action. Before I felt almost in the position of a barrister without a brief; now, however, I breathe more like a politician with a definite policy to pursue. It has, as it were, given me a new lease of life, and awakened pleasures hitherto wholly unappreciated and unknown.

Now there are many methods by which a collection of insects may be formed and arranged so as to be subservient to and assist in the elucidation of scientific problems. The method of course will vary according to the particular problem or series of problems for which the student possesses a special predilection. In the remaining portion of this essay I will endeavour to explain the method which I have adopted, and which has afforded me such an immense amount of pleasure. I must first of all own that no important results have as yet been obtained; it must be borne in mind that I am at present practically only a tyro in the particular line of research which I have after careful consideration finally decided upon, so that the paucity of material and data which I have obtained have precluded the possibility of my elucidating any biological problem of consequence. I do not, however, despair.

Well, then, the two subjects which I have decided to study, and to which I propose to direct my whole attention in the future, are Distribution and Variation, with especial reference to the Rhopalocera, European and Exotic. The reasons which have influenced me in this predilection need not be entered into here, neither why I prefer to patronise the butterflies. Suffice it to say that I find this group of insects more suitable for studying the various problems connected with the two branches of biological science indicated. Both of these subjects are so intimately connected with each other that they can be studied practically side by side, and the formation and arrangement of the collection made with reference to the two at the same time. In order to provide a proper and uniform basis to work upon, I have prepared a series of maps, tables, rules, and formulæ for my guidance.

The maps consist of two series. In the first, which illustrates the zoo-geographical regions, the world is divided into six regions and twenty-four subregions, after A. R. Wallace. Each of these subregions I propose to study, and deal with in detail one by one. At present I am confining my attention to the two subregions in which the Continent of Europe is included. My idea is to work out the geographical distribution of each species of Rhopalocera in the area indicated. With this object in view I have prepared another map illustrating the provinces and subprovinces, founded upon the principal river basins and other important physical considerations. A third map in this set serves in a similar way to illustrate the subprovinces in the British Isles. All these geographical divisions and subdivisions are differently coloured, and it is proposed later on to have the data labels similarly coloured in order to correspond with them; but of these more anon.

A second series of maps, consisting of three likewise, serves to illustrate the annual isotherms throughout the globe, in Europe and the British Isles, in addition to the zones of vegetation encountered between the equator and the poles. These are supplemented by tables giving the altitudes of the corresponding vertical zones of vegetation upon all the principal mountain ranges in Europe.

My aim is to obtain a series of every species possible from all these numerous geographical and climatalogical (= vertical) subdivisions, or as many of them as I am able. The principal points which I bear in mind are, firstly, to obtain as typical a collection of the Rhopalocera Fauna of each subdivision as possible; and secondly, to procure specimens illustrating the limits of variation of each species in them, special attention being directed to seasonal dimorphism.

This system has several drawbacks, the principal of which is the immense amount of room which each species occupies, especially in the case of those which possess a wide distribution, vary considerably in different parts of their range, and have several broods in the year. But the scientific advantages far outweigh any inconvenience occasioned by the vast amount of space required to carry it out. All the data labels which I employ correspond with the maps and tables above described, figures and letters being given instead of long particulars, the key to which is very simple. Every specimen is in addition labelled individually with a consecutive number which corresponds with a catalogue, wherein are entered full particulars of date, locality of capture, &c. The data labels illustrate the history of series or groups of specimens. The following is an example:—

. 1. C. 8. e
N. 5 a. Gen. 1

The key to the above is as follows:—

The first line refers to the Geographical Distribution. The Roman numeral indicates the Zoo-geographical Region (I.=Palæarctic Region). The first Arabic numeral indicates the Zoo-geographical Subregion (1=North European Subregion). The capital letter indicates the Province of the Subregion (C=West Central Europe). The second Arabic numeral indicates the Subprovince (8=France and Switzerland in the Basin of the Rhône, except the portion of the former country in the Basin of the Meuse, and a narrow strip along the Mediterranean littoral in the Basin of the Lower Rhône, which belongs to the Zoo-geographical Subregion 2 of A. R. Wallace). The small alphabetical letter indicates the District (e=Basin of the Upper Rhône).

The second line refers to the Climatal (or Vertical) Distribution and Generation. N. & S. mean North and South of the Equator (N.=North of the Equator). The first Arabic numeral indicates the Climatal Zone or its equivalent Vertical Zone (5=Cold Temperate Zone or Region of Deciduous Trees). The small alphabetical letter indicates the Sub-Climatal Zone (a=the Vine Zone). Gen. is an abbreviation for Generation, and the Arabic numeral following indicates the number of the generation in the season.

All the above numbers and letters, as I have already intimated, correspond with the maps and tables which I have prepared, and which furnish the key to the labels employed, and form the basis upon which the collection is being built.

The other subject which shares my attention is Variation. My object is to study and investigate the connection between Morphology and Climate (Latitude, Longitude, Altitude, &c.), and Local Conditions (Geology, Flora, &c.). Under the heading of climate special attention is directed to seasonal dimorphism and local variation, the latter coming also under the second category of local conditions.

To assist in more intelligently comprehending the relative value of the different degrees of variation to which Rhopalocera are subject, in order to arrange them in their proper position in the collection, I have found it necessary to formulate a series of rules for their classification; but they are practically only provisional ones at present. For my purpose therefore I classify the different forms of Rhopalocera as follows:—

1. Types.
   - *a.* Aberrations.
   - *b.* Hermaphrodites.
2. Seasonal Varieties of Type.
   - *a.* Aberrations.
   - *b.* Hermaphrodites.
3. Geographical Varieties of Type.
   - *a.* Aberrations.
   - *b.* Hermaphrodites.
4. Seasonal Varieties of Geographical Varieties.
   - *a.* Aberrations.
   - *b.* Hermaphrodites.

Then follow—5, Mimetic Varieties of Type; 6, Seasonal Varieties of Mimetic Varieties of Type; 7, Geographical Varieties of Mimetic Varieties of Type, with their respective Aberrations and Hermaphrodites; and, lastly, 8, Hybrids.

Each of the above is again subject to subdivision, such as Melanistic, Xanthochroic, &c.

The following are three specimens of the labels which I employ for the purpose of illustrating the degrees of variation:—

1*a* Ab. *taras.*	2*a* Ab. *nelo.*	3 Var. *alpina.*

The numbers and letters correspond with the list given, and represent respectively *Syrichthus malvæ* ab. *taras* (1*a*), *Pieris rapæ* var. *metra* ab. *nelo* (2*a*), *Hesperia comma* var. *alpina* (mihi), (3). I may here remark that I do not repeat the name of the species in each sublabel.

In a great many cases varieties and aberrations in one district may be represented in another by a variety or aberration of different value. As an instance we have the form *lutescens* (mihi) of *Vanessa c-album* occurring on the Continent as a variety (a seasonal variety), but in this country only as an aberration of the first brood. In this relation I may remark that I follow the practice of Dr. Staudinger in discriminating between varieties and aberrations. In order to show the connection in this case between the aberration and the variety, of the form from this country, I prepare the label as below:—

1*a*=2

Ab. *lutescens.*

The sign 1*a*=2 signifies that the form 1*a* is represented in another district by a form of superior value (2). The series of specimens illustrating the aberration would follow the group illustrating the seasonal variety, the latter being the superior form, and therefore taking precedence. The following label would indicate the superior phase of variation:—

2

Var. *lutescens.*

A number of other combinations may be made with the signs in a similar way.

And now I come to the subject of Ocellation. I have prepared a special label for the purpose of illustrating this particular kind of variation in the Satyridæ, the following of which is a specimen:—

12345	12345
10000	10000

The four squares represent the four wings, and the Arabic numerals the submarginal spots upon each of them. The typical number of spots in each wing is represented by the same number of figures, and the number commences with the spot situated nearest the apical point. When any spot in the series is absent it is represented by 0, thus 12005, 10340, 10040. When very indistinct, only rudimentary, or when blind (*i.e.* when the typical form possesses a spotted centre), it is represented by x, thus 12xx5, 1x34x, 1xx4x. When two or more spots coalesce they are put in parentheses thus (12)345, 1(234)5. When the series is discontinued, or when there are two series of spots, a dot is placed between each of them, as 12.345.

The above formulæ I have found of great assistance in studying the ocellation of the Satyridæ, and am therefore in a position to recommend its use by students of this particular phase of variation. I hope I have succeeded in making the description of it sufficiently intelligible.

The data labels which I employ are of a uniform size of one by half an inch, the same as those illustrating variation, with the exception of those relating to ocellation, which are only about a third of an inch in width, the length (one inch) being the same however as the others.

The system of research which I here publish, and the method of arranging the collection in illustration of it, may possibly be improved upon; and if any of your readers have anything to suggest it will be very acceptable. In the meantime I will conclude by repeating that it affords me much pleasure, from an intellectual point of view, which I did not dream of when I contented myself with being a "mere collector." Now that Darwin, Wallace & Co. have paved the way, the time has fully arrived when those who are interested in insects should do something more than amass large collections, which, without a proper method and system, are practically devoid of scientific interest or value whatever. The possessors of them are not one whit, in my mind, superior to ordinary postage-stamp collectors.

Birmingham, Aug. 30th, 1896.

UNIFORMITY IN PINNING AND SETTING LEPIDOPTERA.

By Wilmot Tunstall, F.R.M.S., F.S.A.

The subject of "Uniformity in Pinning and Setting Lepidoptera" has not hitherto received the amount of attention its importance deserves. I was therefore glad to see the subject occupying the front page of your September issue. The various articles which have appeared under these heads (Entom. xxix. 83, 125, 231, 269) cannot fail to be interesting and instructive to experienced and inexperienced lepidopterists alike, since they help one to make trials and comparisons, and adopt the little wrinkles of others, and so arrive at the most convenient, as well as the quickest, neatest, and best, methods of working.

No one who has made any attempts at exchanging can fail to have been impressed with the absolute truth of what has been said with reference to the great want of uniformity in pinning and setting. Quite as often as not, when an exchange has been made, it is found that the specimens received are so differently set from one's own made-up series that the symmetry of the whole would be entirely spoiled by the addition of the exchanged specimens. This is often both disappointing and annoying, and is not as it ought to be; for when British Lepidoptera or other entomological specimens are exchanged they ought all to be so set that they will look uniform in any strictly British collection. Here I should like to say most emphatically that this is quite possible of attainment. I am surprised none of your correspondents have gone to the bottom of the matter, and suggested a real and practical way out of the difficulty. Mr. Searancke's contrivance (*ante*, p. 231), though novel, is no remedy, for it would only be necessary for two persons to pin a given species on different blocks, and then exchange, to show that no uniformity had been arrived at. Mr. Leech (*ante*, p. 270) does in part suggest the remedy, but does not, I think, go far enough. It seems to me the matter should be taken in hand by our recognized leading and representative British Entomological Society or Societies combined; and surely the subject is important enough for them to do so at once! In the first place this society or combination should adopt a range of standard sizes of pins, each size properly numbered. These should in future be known to the world as "The British Entomological Society's Standard Pins and Pin-numbers." Each size should be of a standard length, and be made from wire of a strictly defined wire-gauge. (Standard wire-gauges already exist.) This would compel pin manufacturers to come into line, and produce entomological pins for British use which would be the same from all makers, quality perhaps excepted. Next let the Entomological Society decide whether a specimen looks best stuck at the bottom of a pin resting on the paper, stuck at the top as if on a stilt, or midway, looking something like respectable, and hitting the happy medium. Uniformity would undoubtedly be best obtained by fixing the centre of the pin for the centre of the insect, as every eye can fix this point best, by reason of there having to be the same length of pin on the under as on the upper side; besides which you avoid extremes, and secure the important advantages which have been referred to respecting mites and air-circulation. Let the Society recognize the centre of the pin as its standard of height, and then go a step further, and adopt one or other of its own standard pins for every named species on the British list (giving two numbers where necessary by reason of the male and female varying greatly in size), have the number of pin to be used printed by the side of the name on the exchange lists, and the greater part of the difficulty would be solved. Every lepidopterist would thenceforward work to the exchange list, which would show him at a glance the standard number of pin he must use for each insect. Even if one had to pin hosts of captures one could not immediately identify, there would be no difficulty, as we should instinctively know by comparison which size of pin to use. I think five, or at most six, sizes of pins would meet all requirements for the Macro- and Micro-Lepidoptera put together. One should, in adopting or fixing the wire-gauge for the smaller sizes, err, if err at all, on the side of strength.

The mechanical and engineering world adopted years ago the Whitworth standards, which detail the number of threads per inch for different sizes of bolts, screws, nuts, &c.; also steam, gas, and water tubing. The adoption of these standards revolutionized those trades, bringing perfect order out of chaos and confusion. There are standards of thickness for copper, tin, zinc, and other sheets; also standards of thickness and weight for lead, glass, &c.

The Royal Microscopical Society has its own standard screw for objectives and other fittings, to which all English makers conform, and by means of which all English-made objectives are interchangeable; and why should not the British Entomological Societies have their own standard pins, and standard or recognized styles of setting? It is only necessary for these standards to be fixed, to be stamped with the authority of our leading Entomological Societies, and then be given out to the world through the journals and an authorized exchange list, to make them a matter of common knowledge and common adoption.

If we have no single Entomological Society with a "standing" or "status" equivalent to that of the Royal Microscopical Society, and powerful enough to make its authority known and respected, then either let one be formed, or let a joint committee of our expert entomologists be appointed by the leading Entomological Societies to work the matter out; but by all means appoint gentlemen who can and will meet together often for the purpose till the difficulty has been satisfactorily overcome. This committee should also definitely decide whether oval or flat setting is or shall be the recognized British style, and further settle the angle at which the wings are to be set. If four or five representative species of Lepidoptera were figured at the top of the authorized exchange list, showing the direction the lines of the wing margins should take or be aimed at, also a figure or two, making plain to all the very explicit instructions which have been given respecting the insertion of the pin through the thorax, these points taken collectively would embrace all the details of pinning and setting necessary to produce something very nearly approaching perfect uniformity. Adopt standards, and you may depend upon it none but standard pins would be asked for, purchased, or made. The text-books would soon give definite instructions. You would soon find a very marked improvement in setting all round, and ten times more satisfaction in exchanging than can at present possibly be. All collections commenced after the general adoption of fixed standards would be uniform throughout. Beginners (remember these may be persons of vast and ripe experience, but not entomological) would be able to retain much more of their earlier work in after years, by reason of having commenced to work on systematic and proper lines. Some species might even receive some amount of protection through its not becoming necessary to throw away so many samples of early work, which were badly set through lack of proper knowledge at the outset.

The points I have named could easily be dealt with, and in a short time, by—1st, comparing the numbers and sizes of different makers' pins, and then selecting the most suitable sizes and numbers as the standards; 2nd, by comparing insects set at different heights and placed side by side; 3rd, by going through a typical collection and jotting down on an exchange list the standard number of pin to be used for each species. The publication of an authorized exchange list, giving details and examples, would do all the rest. I would treat all orders of insects in this way, so that there would be uniformity in all orders. Until some hard and fast lines such as I have attempted to describe are laid down, uniformity in pinning and setting cannot and never will be attained. All who are interested in this subject ought to bring the matter prominently before the various Societies with which they are connected, and agitate for a new departure and definite instructions on the subject till we get them.

Brook House, Meltham, near Huddersfield, Sept. 3rd, 1896.

THE ANDROCONIA OF *CALLIDRYAS FLORELLA.*

By J. C. Rickard.

The genus *Callidryas* is allied to *Gonepteryx; C. florella*, although its wings are unangulated and is a larger species, is much like *G. rhamni* in general appearance. The wings of the male are greenish white, with small dark stigmata on the primaries; there are faint almost invisible rust-coloured spots at the ends of the nervures; it is, therefore, nearly unicolorous. The under side is somewhat darker, with many minute wave-like transverse markings; there is a small reddish stigma on the under side of each wing. Near the base of the inner margin of the primary of the male is a brush 12 mm. long, composed of radiating silky hairs 5 mm. in length; the hairs originate on the under side of the wing, but a part of that portion of the wing that produces them is folded over so as to bring the greater portion of the brush to the superior surface, where it forms a series of plumes, part of which overlie the anterior and part the secondary wings; the other portion of the brush is pressed down close to the under side of the wing; the cause of part of the wing being turned over is purely mechanical, and results from the hairs being so thickly crowded together that there is not sufficient space for them without slightly distending that part of the membrane on which they grow. As there is nothing to cause a similar expansion of the upper side, it follows that the lower membrane becomes a little wider than the upper, consequently the edge of that part of the wing "buckles" or turns upwards; the rest of the inner margin, beyond the brush, resumes its normal position, only the part bearing the brush being turned up. On the upper surface of the secondary wing, between the costal and subcostal nervures, is a lozenge-shaped patch of modified scales about 8 mm. long and 2 mm. broad, composed of scales so thickly crowded together that they are forced to remain in the nearly perpendicular position they occupied on the unexpanded wing; the patch is immediately below the brush of the fore wing. Part of the base of each wing is more thinly clothed with scales than the remaining portion, the two parts being abruptly divided, so as to be plainly seen with a pocket-lens. One is almost inclined to believe that some of the scales forming the general covering have been requisitioned to form the androconial patch, but as there is no "patch" on the upper wing such an explanation would scarcely be adequate. The scales of the patch seen by transmitted light are dark coloured, and like most highly specialized scales are rounded, or without pectinations at their apices; the striæ are very fine, owing to this and the opacity of the scales they are not readily seen; by reflected light they appear white and highly polished; the scale-walls are seen to be thrown into longitudinal folds, as if partially emptied of their contents; the hairs of the brush have rounded apices, and seem nearly black by transmitted light.

The structures described above form a good example of what are known as "Androconia," and are supposed to be the agents employed in the production and diffusion of odours; but a little consideration will show how closely they resemble stridulating organs; it is probable that they may serve both purposes, the friction between the brush and patch promoting the diffusion of scented vapours or particles, at the same time producing sound, which although inaudible to our ears may nevertheless have a real existence. I do not wish to deny the association of these structures with scent-producing powers, but the alleged existence of the odours seems to rest mainly on hypothetical considerations; on the other hand, the movements of the brush over the up-turned ends of the scales forming the patch must produce vibration, therefore sound must necessarily be evolved.

May not a word be said in favour of the visual organs of the butterfly in question. If its senses of smell and hearing are gratified, or if they in some measure conduce to its well-being, why may not its power of sight also perform its part? The aigrette-like plumes of the brush form what to us are very graceful objects. Are the owners of them denied a similar gratification? They may be unable to have a satisfactory view of their own individual adornment, but surely they can see those of their fellows; and the sight of these ornamental plumes is probably appreciated by the female portion of the *florella* population. Androconia, such as I have endeavoured to describe, are, I believe, generally regarded as guides to enable one sex to more readily discover the near proximity of the other sex. This seems a false view of their function; but if we regard the odoriferous emanation as productive of sexual excitability, we can understand that a similar result may be achieved by means of the senses of sight and hearing; all three senses, in this species, performing their parts in promoting its well-being.

8, Halifax Road, Cambridge.

NEW BEES OF THE GENUS *MELISSODES*.

By T. D. A. Cockerell.

(1.) Melissodes sphæralceæ, n. sp.

♂. Length about 9½ mm., antennæ 5 mm. Black, rather densely covered with erect mouse-grey hair, which becomes white on the face, lower part of cheeks, lower part of pleura, margins of abdominal segments, and legs. Head broad, clypeus wholly black, mandibles with a large yellow spot without near base, face quite densely hairy. Vertex shining but punctured, flagellum entirely fulvous beneath, its first joint distinctly shorter than the fourth or third. Mesothorax shining, with large and deep rather close punctures; metathorax closely punctured, except its basal middle, which is very sparsely punctured. Tegulæ shining brown, hairy. Wings hyaline, nervures and stigma fuscous, third submarginal cell longer than first, narrowed rather more than half to marginal. Legs black, tarsal joints after the first rufous. First tarsal joint of all the legs with orange-rufous hairs on inner side. First segment of abdomen with erect very pale grey hairs, the first five segments with rather broad apical bands of appressed dull white hairs, the dark areas before these bands with fuscous hairs, even on the first segment. On the sixth segment the band itself becomes pale fuscous. Fifth and sixth segments with a tooth on each side; apex narrowly truncate, broad at base, strongly notched on each side before the end.

Hab. Santa Fé, New Mexico; three specimens, July 25th, 1895, in Mr. Boyle's garden, at flowers of *Sphæralcea angustifolia.*

There is another species with a black clypeus in the male found in New Mexico, *M. tristis*, Ckll., which I have taken in the Mesilla Valley and at San Marcial. It is easily known from *sphæralceæ* thus:—

Larger, antennæ longer than head and thorax, mandibles with no yellow spot, pubescence of sixth abdominal segment whitish; species of the Upper Sonoran zone *tristis.*

Smaller, antennæ only reaching to metathorax, mandibles with a light yellow spot, pubescence of sixth abdominal segment brown; species of the transition zone *sphæralceæ.*

M. intorta, Cr., from Texas, has the clypeus black in the male, but the abdomen is not banded, and the antennæ are shorter than in *sphæralceæ.*

(2.) Melissodes townsendi, n. sp.

♂. Length about 15 mm., stoutly built, black, covered all over with short yellowish-fulvous pubescence, which becomes white on the face and lower parts of cheeks and pleura. Head broader than long, inner orbital margins nearly parallel, face not very much broader than the width of an eye, vertex relatively narrow, very little broader than face; pubescence of face and occiput dense but rather short; clypeus, labrum, and base of mandibles very pale yellow; scape hairy, flagellum rufous beneath, first joint of flagellum much shorter than third, and less than half as long as second. Thorax densely covered with fulvous pubescence, so that the surface cannot be seen; on the pleura beneath the pubescence is white, while on the scutellum it is very dark fuscous. Tegulæ reddish testaceous, pubescent. Wings smoky-hyaline, nervures fuscous, second recurrent nervure joining third submarginal a little before its end, first submarginal cell about as long as second, third longer, narrowed somewhat more than half to marginal. Legs densely covered with pale fulvous pubescence, conspicuously plumose on hind tarsi, spurs pale rufous, terminal joints of tarsi and bases of claws rufous. Abdomen stout, densely covered with fulvous pubescence, erect on basal two-thirds of first segment, otherwise appressed. Hind margins of segments more or less whitish. Apex rounded-subtruncate, apical hairs concolorous with the rest.

Hab. Las Cruces, New Mexico, Aug. 5th (C. H. T. Townsend). One specimen only, with the antennæ unfortunately broken. The species must be rare, as I have never met with it. It has been compared by Mr. Fox with the types at Philadelphia, and he assures me there is nothing like it.

This belongs with the series of *M. obliqua*, in which the males are large and stoutly built, and the vertex is narrow in comparison with that of the smaller species. It differs at once from *obliqua* (which occurs on *Cleome serrulata* at Santa Fé, N. M.) in having the abdomen pubescent all over, instead of banded. It is, however, quite closely allied to it.

(3.) MELISSODES RUIDOSENSIS, n. sp.

♂. Length 12½ mm., anterior wing 8 mm., antennæ 9 mm. Black, with moderately dense erect pale ochreous-grey pubescence, becoming whitish on lower parts of face, cheeks, and pleura. Head broad, area behind ocelli closely punctured, that on each side of them practically impunctate. Clypeus primrose-yellow, a spot on each side and the anterior margin black, labrum black, mandibles without any yellow spot. Antennæ wholly black, long, extending about as far as hind margin of second abdominal segment; flagellar joints longitudinally keeled, strongly granular, first joint of flagellum very short, considerably less than a quarter the length of the long second joint. Thorax quite densely hairy, some black hairs intermixed on scutellum and hindmost portion of mesothorax, mesothorax shining, with tolerably close large punctures. Tegulæ piceous, wings smoky-hyaline, thinly but noticeably pubescent, nervures piceous, third submarginal cell narrowed considerably more than half to marginal. Inner sides of first joints of tarsi with orange-rufous hairs, spurs pale ochreous. First segment of abdomen covered with long erect pale ochreous hairs; segments 2 to 5 with rather broad conspicuous subapical bands of appressed pale ochreous hairs, that on the second segment narrowed in the middle; before each of these bands the segment is thinly clothed with black hairs; the second segment has pale hairs about its base. Sixth segment with fuscous hairs, those of the extreme margin pallid. Margins of all the segments whitish-hyaline. Apex dark rufous, truncate, with a small square notch on each side. Subapical lateral spines small.

Hab. Ruidoso Creek, New Mexico; two asleep in a corolla of *Pentstemon*, 7400 ft., July 6th; one on *Eustoma* ? sp., 7500 ft., July 6th; three on *Pentstemon*, 6400 ft., July 8th. All collected by Prof. E. O. Wooton. I sent an example to Mr. Fox, with the remark that I supposed it to be new, but it might possibly be *M. confusa*, Cr. He writes that it "differs from *confusa* in the black hair of centre of dorsulum, and at base of dorsal segments; moreover, it has but five white bands, unless one be worn off (on last segment), whereas *confusa* has six."

(4.) MELISSODES PALLIDICINCTA, n. sp.

♀. Length about 13 mm., antennæ about 3½ mm. Black with pale ochreous pubescence, whitish on lower parts of face, cheeks, and pleura. Head extremely broad, face broader than long, vertex shining, very sparsely punctured, face thickly pubescent, antennæ dark, the flagellum only obscurely rufescent beneath. First joint of flagellum as long as second and third together, second a little shorter than third. Thorax with dense but rather short pubescence, scutellum with short black hairs. Mesothorax shining but strongly punctured. Tegulæ piceous, hairy, with a nude shining spot. Wings greyish-hyaline, nervures piceous, third submarginal cell narrower at top than second. Legs quite hairy, the hairs pale, almost silvery, scopa of hind legs rather thin, conspicuously plumose. Claw-joints becoming rufescent. First segment of abdomen with erect pale grey hairs; segments 2 to 4 with broad subapical bands of appressed white pubescence, very conspicuous, more or less notched medially behind. Bases of segments 2 to 4 intensely black, with short black hairs, extreme base of 2 covered with pale hairs. Fifth segment and apex clothed with dark fuscous hairs. Pygidium transversely striatulate. The nude apex of the first segment appears narrowly white or creamy, that of the others black, the apical margins are really transparent, and take the colour of the hair beneath them. Hairs on inner side of first joint of hind tarsi black.

Hab. West Fork of Gila River, New Mexico, July 12th and 16th, ten specimens (C. H. T. Townsend); Santa Fé, N. M., on alfalfa, June (Ckll., 1123); Watrous, N. M., July 13th, 6200 ft. (Ckll., 2495). I sent an example to Mr. Fox, stating that it appeared to be new. After comparing it with the types in Philadelphia, he states that the species is apparently good. It has some superficial resemblance to *Synhalonia belfragei*, Cr., but that is structurally quite different. It is perhaps as near to *M. montana*, Cr., as to anything, but that has the abdominal bands golden ochraceous.

(5.) MELISSODES GILENSIS, n. sp.

♀. Length 13 mm., antennæ about 4 mm. Rather stout, black, with silky-grey pubescence (and some black) on head and thorax, and pale ochreous pubescence on abdomen. Head rather broad, face from vertex to margin of clypeus almost exactly square, clypeus bare, closely, rather coarsely, and more or less confluently punctured; face with rather thin grey pubescence, occiput with black hairs in front and pale hairs behind, lower margin of labrum with a tuft of orange hairs; flagellum slightly rufescent beneath, its first joint about as long as the second and third together. Thorax rather densely covered with grey pubescence, slightly tinged with ochreous on dorsum, posterior half of mesothorax, and scutellum, with black hairs. Mesothorax shining, the punctures not very close, the surface can be distinctly seen near its hind border, and the anterior part of the scutellum is also relatively bare. Tegulæ piceous, the anterior half hairy. Wings smoky, nervures fuscous, third submarginal cell narrowed more than half to marginal. Pubescence of legs whitish, scopa of hind legs dirty white, fairly dense, distinctly plumose, anterior tibiæ with a brush of orange-red hairs on inner side, first joint of anterior tarsi with dark fuscous hairs on outer side, and dark orange-rufous hairs on inner, first joint of middle and hind tarsi with pale hairs on outer side, and reddish-orange hairs on inner side. Claw-joints rufous. First segment of abdomen with rather thin yellowish-grey hairs; its hind margin narrowly pallid. Second segment with two bands of appressed pale ochreous hairs, one median, the other basal. Third segment covered with similar pubescence except hind margin, fourth segment wholly covered, fifth segment and apex with black pubescence—a sort of purplish-black, the colour of the spores of certain agarics. Venter bare, except the margins of the segments, which are fringed with dark brown hairs. There is a conspicuous patch of brown-black hairs on knees of hind legs, and the middle tibiæ without have the pubescence largely of the same colour.

A male specimen, unfortunately without its antennæ, taken on the same day and at the same place as some of the females, almost certainly belongs here. It is somewhat smaller than the female, the wings are not so dark, the pubescence of thorax above is more inclined to be yellowish, the black hairs of the thorax are almost entirely confined to the scutellum, the pubescence of face is copious, and covers the clypeus, which is pale primrose-yellow, with a black margin. Labrum and mandibles wholly black. Second abdominal segment with only one hair band, that subapical; hair bands with fuscous or black hairs just in front of them, not conspicuous unless the insect is seen from the side; pubescence of apex pale. Inner side of first joint of hind tarsi with bright orange-rufous hairs. This is easily known from *ruidosensis* by the light pubescence of the apex of the abdomen.

Hab. West Fork of Gila River, New Mexico, July 12th, 16th, and 17th; six females, one male (C. H. T. Townsend); La Tenaja, near Santa Fé, N. M., a form with a somewhat broader face, but evidently the same species; two females (Miss Myrtle Boyle).

Mr. Fox has kindly compared this with the types in Philadelphia, and remarks that it comes near *montana*, Cresson. A male from the West Fork of the Gila, July 16th (Townsend), is identified by Mr. Fox as *montana;* it differs from the male of *gilensis* in having the abdomen more uniformly hairy, and the pubescence of the apex black. The labrum also is yellow, and the mandibles have a yellow spot without.

A female *Melissodes*, which is common at Santa Fé, Mr. Fox says is apparently identical with *confusa*, although what I regarded as its male is not the same as the male assigned to *confusa* by Cresson. This bee, which is more especially found on flowers of *Grindelia squarrosa*, but also on *Lepachys tagetes*, about the beginning of August, is very much like *M. gilensis*, but is known from it at once by the hairs on inner side of first joint of hind tarsi of the female being black, whereas in *gilensis* they are reddish orange.

Mesilla, New Mexico, U.S.A., July 5th, 1896.

ON TWO NEW *CHARAXES* FROM THE LESSER SUNDA ISLANDS.

By the Hon. Walter Rothschild, F.Z.S., F.E.S., &c.

1. Charaxes sumbanus, sp. nov.

This magnificent species belongs to the *polyxena* group, but it is unlike any other *Charaxes*, and has the shape of the African *C. caudiope*. The fore wing has deeply concave outer margin, and strongly arched costa.

♀. Fore wings: basal third dark russet-brown, with reddish tinge, rest sooty black; from the centre of costa almost to vein 1*b* runs a broad oblique white band, 7 mm. wide at costa and 4 near vein 1*b*; this band is split up by the veins into six spots, of which the last is double, and the spot between veins 2 and 3 is conspicuously larger than the one before it; the band includes two black dots behind costa; half-way between the band and apex just under the costa is a small dirty buff spot. Hind wings: rufous chocolate; near the margin is a broad black band composed of seven oval spots, the two first 9 mm. wide, and the following gradually diminishing to the anal angle; within the spots is a white dot, which in the three first stands nearer the outer edge; the first four black spots coalesce, while the three last are separate; on each side of the black band is a brownish yellow line, that on the inner side consisting of crescent-shaped spots, which are bordered inside with dark brown; outer margin reddish chestnut, darker at anterior half; tip of tails yellow; length of tails 9 mm. and 7 mm. respectively; inside the brown border of the crescent-shaped marks are three brownish white spots, first palest and largest, forming a short curved band. Under side: fore wings isabelle drab; white discal band as above; the two black dots replaced by two tawny ones, and a minute third one before them; the white band is bordered on inner side by a strongly marked tawny line stopping at vein 5; between this and base are five tawny lines—one on the disco-cellular veinlets, the next very irregular between costa and vein 1*b*, the three others within the cell; beyond the white band is a transverse line of dark brown lunules; the area beyond this line is paler, so as to form oval whitish drab patches, each with a spot in the centre, the first five spots brown and the last two black; spots 1, 6, and 7 largest. Hind wings: ground colour the same as fore wings; a central transverse white band between costa and abdominal margin, its inner margin irregular, deeply sinuated, bordered by a tawny line interrupted at veins; between it and base are three broken irregular lines of tawny colour, besides a short one on disco-cellular veinlet; outside the white band is a transverse line of whitish buff lunules, bordered inwardly with brown and outwardly heavily with chestnut; there is a submarginal row of seven blue spots joined to white and black dots, between them and outer margin is a dirty buff line; tails and margin buffy drab. Body rufous above. Length of fore wing, 43 mm.

Hab. Sumba or Sandlewood Island (W. Doherty; February, March, 1896).

2. CHARAXES SUMBANUS SAMBAVANUS, subsp. nov.

♀. Differs from *sumbanus* mostly on under wings; the white central band on upper side consists of five instead of three spots; the first is 1 mm. shorter, and band much straighter; the anterior submarginal yellow spot is wanting, and the inner yellow line of lunules much broader and paler; tips of tails almost white; on fore wing there is a costal white streak in front of the white band. Under side: markings all more strongly accentuated; the space between white band and line of lunules dark brown instead of drab; outer margin of fore wing less concave, and costa less curved.

Hab. Bima, Sambawa (W. Doherty; February, 1896).

THE LATE MISS GEORGIANA E. ORMEROD, F.E.S.

Miss Georgiana E. Ormerod was the daughter of the late George Ormerod, D.C.L., F.R.S., of Sedbury Park, Gloucestershire; and Tyldesley, Lancashire. She was born July 23rd, 1823, in London; and died at St. Albans on August 19th last, aged seventy-three years.

Educated under the superintendence of her mother, a most talented woman, the deceased shared with her three younger brothers in their scientific pursuits.

Botany and conchology were the subjects in natural history to which she devoted especial attention, and in the latter she was well versed, including careful observations of the habits of such of the British species as came under her notice. On removing to St. Albans, in 1887, she presented her collection, then numbering approximately 3000 distinct species, to the Beaumont Park Museum, Huddersfield.

In later years her attention was more given to entomology, as a subject which could be more practically employed; and in 1880 she was elected a member of the Entomological Society of London. After this much of her leisure time was given to entomological drawing, showing the insects in their different stages, carefully drawn and coloured (so far as possible) from life. Some of these drawings were of life-size, or not too large for convenient use in cases at various of our Agricultural Colleges. But her chief work, which she continued until within a very few weeks of her decease, was the execution of large coloured drawings, also showing the insects in their various stages, of which she presented large numbers for entomological service to scientific friends, or for use in various of our Agricultural Colleges in this country and in some of our colonies.

Some of her work was recently shown during the past summer in connection with the collection of insects injurious to agriculture exhibited by her sister, Miss Eleanor Ormerod, at the Bath and West of England Society's Show at St. Albans, which collection has since been presented by the sisters to the University of Edinburgh, by whom it has been placed in the Edinburgh Art and Science Museum, under the name of "The Ormerod Collection."

Miss Ormerod was a great reader, and especially fond of following up any historical point which took her fancy; and was also a good linguist. She was a woman of strong religious principle; and will be much missed, not only by her friends, but by her poorer neighbours.

E. A. O.

NOTES AND OBSERVATIONS.

ACHERONTIA ATROPOS.—Upon seeing Dr. Sharp's notes on this larva (*ante*, p. 284), I was in hopes that I might have gathered some information respecting the care of these larvæ in captivity. But his interesting remarks were, I found, confined to the particular conditions only of those which had come into his own possession this year. I shall be glad if some entomologist will kindly give me some information as to the treatment of this insect in captivity. At various times I have had the larvæ and pupæ brought to me from the potato grounds in our fens here, but I have never been successful in developing the perfect insect. Sometimes the larva has died, at other times the pupa, which latter, when unearthed, has been found covered with a pink mould. Is it desirable to unearth the pupa, as it is not possible to retain the earth shut up in a cage in a natural condition? And if so, is it an advantage to resort to artificial heat and moisture to aid the change into the perfect insect in October?—EDWARD R. WALKER; Billinghay Vicarage, Lincoln, Sept. 10th, 1896.

From the communications from various localities in your last number, and from the many larvæ and pupæ I have heard of and seen here, this is an "*atropos* year." As the rearing of the moth from the pupa is very uncertain, I beg to refer your younger subscribers to a paper in which I described a plan for "forcing," which I have since found successful, and which I intend to follow with those pupæ I have obtained this year. The paper referred to appeared in the 'Entomologist' for May, 1886, vol. xix. p. 125.—(Dr.) H. W. Livett; Wells, Somerset, Sept. 7th, 1896.

Note on Chesias rufata (obliquaria).—I have bred a number of this insect each year for some years past, and have been much surprised at its very eccentric range of emergence. Newman says it "continues on the wing from the middle of May to the middle of July"; its period is, however, sometimes much more protracted than this, as the following dates, for the last three years, will show:—

1894. First one bred on March 24th, the last on Sept. 28th.
1895. ,, ,, May 31st, ,, ,, June 28th.
1896. ,, ,, April 12th, ,, ,, Aug. 20th.

Of course all were kept under precisely the same conditions. The pupa also not infrequently lays over a second winter in that state; the insect bred on Aug. 20th of the present year was one of a number which pupated in October, 1894.—E. H. Taylor; 52, Mimosa Street, Fulham, Sept. 15th, 1896.

Vanessa c-album.—In the last number of the 'Entomologist,' p. 274, are some remarks from the pen of Mr. Harcourt-Bath upon the above butterfly. As an entomologist who has studied this species for over sixty years, I venture to differ from some of his conclusions. I believe I was the first British entomologist to draw attention to the light-coloured early brood, produced by hybernated parents; Mr. Doubleday assured me I was so. He doubted there being two broods until I convinced him such was the case, and then he begged permission to name the pale early variety "*hutchinsonii*," and thus it was known for some years. Now Mr. Harcourt-Bath renames it "*lutescens*." Is this right? I have during many years reared this species, and never till this year have I found the ova from hybernated parents produce many of the dark form in captivity; their doing so this spring, I feel sure, proceeded from my feeding on currant and hop leaves. About one-fourth of those fed on currant were of the dark autumn form, and every one on hop were so. In former years, when fed on the common stinging-nettle, *Urtica dioica*, there scarcely ever was a dark form. I find the perfect insects bred this year are of smaller size than usual, from the very quick manner in which the larvæ fed up. The finest specimens I have ever bred have been when very early warm springs have tempted the butterflies out, and ova being obtained and hatched, the larvæ have been subjected to a return of cold unseasonable weather, and have fed up slowly. If cold came before the ova hatched they perished, if not placed in a warm room.—E. S. Hutchinson; Grantsfield.

Triphæna subsequa and orbona.—My thanks are due to Mr. Robert Adkin for the valuable suggestions he has thrown out with regard to the above mentioned species as to their being distinct or one. To mention the name of the entomologist from whom I obtained the queried information is simple, and I hasten to disclose it—Mr. Tate, who, as most entomologists will doubtless know, is, and has been for many years, a resident of Lyndhurst. Now, I do not for one instant propose to uphold the truth of his statement; but nevertheless a statement made as a fact pure and simple by one of such large and extended practical experience ought not to be lightly set on one side. I expressed a wonderful surprise at the time, and perchance a rather unbelieving surprise, as my informant at once became most insistent with regard to the circumstances, which certainly appeared to prove it. Of course some mistake might possibly have occurred in some of the transformation scenes in this particular hatch, and the two species might have become intermixed, although apparently derived from the same source; yet even so, I can hardly credit such an occurrence without his knowledge after seeing the exceedingly great care which he bestows upon them. It must also be remembered that Mr. Tate, who gets his living by means of natural history, and who would be rather injured than otherwise if *subsequa* were proved to be identical with *orbona*, seeing that it is a higher-priced insect, must have some evidence, strong enough at any rate to convince himself, to impel him to make such a surprising statement. Altogether, I cannot help thinking that a sufficiently clear case is made out to warrant further careful investigation of this interesting subject, which I sincerely hope will be done by some who have greater opportunities for breeding the insect in question, and greater qualifications for drawing the proper conclusions, than are vouchsafed to me. — C. J. Nash; Pitnacree, Culver Road, Reading, Sept. 2nd, 1896.

Collector *v.* Entomologist.—All collectors ought to thank the Rev. W. Claxton for his remarks (*ante*, p. 286) on the above subject. As a collector myself I cordially do so. I would also beg him to take heart, and never feel "shamefacedness" at the title, but when he reads offensive remarks on the collector to note from whose pen they proceed, I venture to say not from that of a real entomologist. Truly scientific men I have ever found courteous and ready to give information to others less learned than themselves. I doubt if the would-be scientific ever feel the real admiration for the beautiful objects they are experimenting upon that the humble collector does.—E. S. Hutchinson.

High Flat-set Insects.—I was very pleased to read the article by Mr. Leech (*ante*, p. 269) in favour of the continental method of setting insects. For a number of years past I have adopted this style, having been awakened to its advantages by viewing a collection of Lepidoptera brought to this country by a German entomological acquaintance. So infatuated did I become with the high-flat system that I there and then decided to scatter my former collection to the winds and commence afresh, and I have never had any cause to regret the decision which I adopted. Now that there are such facilities for travelling on the Continent, and also on account of the annually increasing number of entomologists who are taking an interest in foreign insects, I will venture to predict that the high flat-set style will become popular before long. In my idea the English style of setting is an appropriate emblem of our insular prejudices, and a practical exposition of the law of amixia.—W. Harcourt-Bath.

Fungi or Androconia?—In the August number of the 'Entomologist,' the article by Mr. J. C. Rickard, after acknowledging criticisms by Dr. Sharp and Mr. Scudder, says, "Neither of these gentlemen seems to have personally investigated the subject, both having referred me to the works of other entomologists." In Mr. Scudder's case, at least, this was simply an evidence of that gentleman's modesty, because certainly no one in the United States has made a more thorough study of just these characters. In his magnificent work, 'The Butterflies of the Eastern United States and Canada,' plates 43 to 51 inclusive are entirely devoted to pictures of androconia and of parts of the wing containing them, showing just how they are attached, in what part of the wing, and also what sort of markings may be found on them. I would like to refer Mr. Rickard particularly to plate 47, figs. 1 and 2, where he would see what is probably as nearly like a spore formation in some kinds of fungus as can well be imagined. Mr. Scudder has examined nearly all our American species, and, though my testimony is not needed in the matter, I have found his pictures in every case absolutely correct, and I cover more or less of the ground each year with my students. If Mr. Rickard will carry his investigations on butterfly scales just a little further, he will find that, except for their greater delicacy of structure, these androconia do not differ from the other wing-scales.—John B. Smith; Rutgers College, N.J., Aug. 8th, 1896.

CAPTURES AND FIELD REPORTS.

Variety of Nemeobius lucina.—I captured a very striking aberration of *Nemeobius lucina* (male) near Taunton on May 18th of this year. The ground-colour of the left fore wing is a light smoky brown, darkening as it approaches the base, where it is normal. The nervules are of the same colour. The brown markings, which are so conspicuous in the normal specimens, are entirely absent, being replaced by a smoky white; the triangular markings on the outer margin are of a shade rather darker than that of the ground colour. The fringe is pure white and not serrated, thus leaving the line around the outer margin very regular. The under side has, like the upper side, lost all its beautiful brown markings, these being replaced by a dull smoky colour.—John Buckland; 4, East Street, Taunton, Sept. 15th, 1896.

Variety of Lycæna icarus (alexis).—At Swanage, on August 11th, I captured a variety of *L. alexis*, with the black spots near the margin of under side of fore wings enlarged into five black lines and with one black line on each side of the hind wings. The aberration of the markings of fore wings is somewhat similar to that shown in the lower of the two varieties of this species figured in Newman's 'British Butterflies.'—E. V. Hall; 4, The Avenue, Brondesbury, Sept. 14th, 1896.

Varieties of Chrysophanus phlœas.—I caught here, Aug. 10th, two varieties of *C. phlœas*. In one specimen the left fore wing is of a pale straw-colour, inclining to copper at the base, the other wings being normal. In the other variety the usual copper colouring is replaced by a dingy white, nearly approaching var. *schmidtii*. — F. L. Blathwayt; Bromyard, Worcester.

Gynandrous and other Varieties of Chrysophanus Phlœas.—We have taken an hermaphrodite *C. phlœas;* left wings male and right female; the antennæ, however, are just the opposite, the longer one being on the male side; the wings are very distinctive. We also met with the shining straw-coloured form, a female, but unfortunately the hind wings have been partly bitten off by some bird or reptile; otherwise it is fine, the fore wings being very glistening. Another specimen we captured has the normal colour, but the band on hind wings is only represented by slight streaks.—E. Sabine; The Villas, Erith, Sept. 10th, 1896.

Variety of Catocala nupta.— On the 17th inst. I captured a specimen *C. nupta*, the under wings of which are devoid of the slightest shade of red or orange, and may be described as dusky black-brown. It is a handsome specimen, and the type very distinctive. Probably it may be a well-known one, but although I have had acquaintance with *C. nupta* for about a quarter of a century and taken varieties, I have never met with anything like it before.— Sidney Cooper; Hawkwood, Chingford, Aug. 27th, 1896.

[A somewhat similar aberration of this species is recorded, Entom. xxv. 243.—Ed.]

Deilephila livornica in Hants.—A specimen of *D. livornica* was caught last month here. It was brought to me by a boy who found it resting on some furze-bushes, a quantity of bedstraw growing near. Unfortunately the specimen is much rubbed on thorax, otherwise perfect.—(Rev.) A. D. Patterson; Belsito, Milford-on-Sea, Lymington, Sept. 12th.

Emergence of Smerinthus populi in August.— On June 28th my friend D. Forbes-Winslow gave me a caterpillar of *S. populi;* the following day it went to earth, and became a pupa on the 30th; and on Aug. 15th a female moth of the dark form emerged. Is not this a record time? The moth was only fourteen days in pupa.—H. W. Bell-Marley; Ravenscourt Park.

Early and Late Emergences.—This has truly been an abnormal season, and the dates concerning the time of appearance of the following species are interesting:—*Hepialus humuli*, flying freely, last week in May; *Abraxas grossulariata*, well out last week in June; *Smerinthus populi*, a pair *in cop.* first week in July, and again a pair *in cop.* Aug. 7th (probably a second brood); *Acronycta megacephala*, a fresh example on July 28th; and *A. psi*, a specimen in good order, Aug. 16th. Are the two last species sometimes double-brooded? — A. T. Mitchell; 5, Clayton Terrace, Gunnersbury, W., Aug. 20th, 1896.

Autumn Emergence of Phorodesma pustulata (bajularia) and Pseudoterpna pruinata (cytisaria).—Both these species normally hybernate as larvæ while quite small; I think, therefore, that it may be of interest to record that out of a brood of *Phorodesma bajularia*, hatched in July, 1895, and sleeved in my garden, one larva fed up rapidly, pupated the middle of September, and the imago emerged on Sept. 24th. The others showed no tendency to feed up the same year, and hybernated quite small, as usual, This year one larva in a small brood of *Pseudoterpna pruinata* has behaved in the same way, pupating on Aug. 18th, and the imago emerging on Sept. 6th. The other members of the brood remain quite normal in size.—E. H. Taylor; 52, Mimosa Street, Fulham, Sept. 15th.

[The emergence of *P. smaragdaria* in September is recorded, Entom. xxviii. 307.—Ed.]

Sphinx convolvuli at Reading.—Yesterday, the 16th inst., I had a fine female of the above species brought me; it was taken in a garden near my house.—W. E. Butler; Hayling House, Reading, Sept. 17th, 1896.

Oberea oculata in Cambridgeshire.—The capture of *Oberea oculata* is, I think, worth recording. I have the satisfaction of saying that a fine specimen of this scarce Longicorn was kindly sent me a few weeks ago by Mr. E. H. Thornhill, of Boxworth, Hunts. It was brought to him by a working man who picked it up in Wicken Fen.—Alex. Nash; Standish Vicarage, Stonehouse, Gloucestershire.

Chœrocampa nerii in Kent.—I have to record the capture of a specimen of *C. nerii* in the village of Stowting, in the south-east of Kent. This insect (I regret to say a very bad specimen) was taken towards the end of July indoors, apparently attracted by the light; it was captured by a lady, to whom I am indebted for sending it to me.—A. R. Upton; Stowting Rectory, Hythe, Kent.

Vanessa antiopa at Skye.—Mr. P. M. Ellis reports to 'The Field':—"On Sept. 10th I captured a fine specimen of the Camberwell beauty on the slopes of Squrr na Gillean, in this island."

Acherontia atropos in England and Wales, 1896.—

Dorsetshire.—A specimen of *A. atropos* flew into our drawing-room at Swanage on Sept. 9th. It is in very good condition.—E. V. Hall; 4, The Avenue, Brondesbury, Sept. 4th, 1896.

Lancashire.—While staying at Fleetwood, at the beginning of this month, I found several pupæ and full-grown larvæ in the potato fields. The people getting potatoes told me that they had seen many of them.—John Taylor; 318, Chadderton Road, Oldham, Sept. 16th, 1896.

Lincolnshire.—Several larvæ have been taken near Panton and Market Rasen this August.—(Rev.) G. H. Raynor; Hazeleigh Rectory, Maldon, Sept. 24th, 1896.

Oxfordshire.—I have lately been presented with a fine larva of this species, taken among potatoes and bindweed at Kingston (Oxon). The larva was fed for several days on the latter food-plant, refusing potato; and it has since gone down.—A. T. Mitchell; Gunnersbury, W., Aug. 20th, 1896.

Sussex.—Two larvæ of the above species were found in a cottage garden near here yesterday, and my gardener brought me one to-day. The coloration of the larva closely resembles its food-plant, which renders it far from a conspicuous object when at rest on a potato-stem; one example, about to pupate, has assumed a yellow coloration exactly like a withered potato-leaf.—J. H. Leech; Ilford Manor, Lewes, Aug. 11th. I found a very fine specimen of this moth, resting on furze, on the golf links at Littlehampton, the early part of this month.—Arthur S. Helps; Glenavon, Weston, Bath, Sept. 18th, 1896.

Brecknockshire.—Four larvæ were found in a small garden near Hay, one of which was forwarded to me. It is rather lighter and more brilliant in colouring than usual, and after reaching the length of over five inches has gone to earth to complete its transformations.—Augustus D. Imms; Linthurst, Oxford Road, Moseley, Worcestershire, Aug. 28th, 1896.

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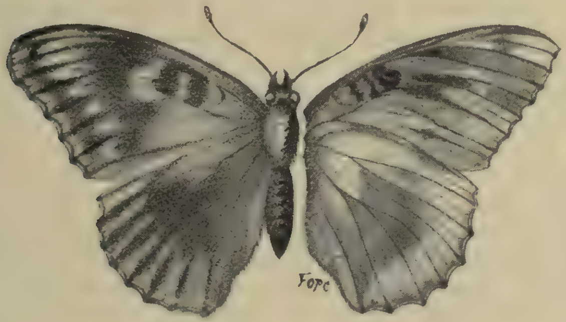
ARGYNNIS PAPHIA, Ab.



This remarkable variety of *Argynnis paphia* I captured July 2nd this year in Whatcombe Wood, near Blandford. It is a male, and measures a little over two and a half inches from tip to tip of fore wings. All the lighter colouring of the fore wings is of a deep fulvous, the darker markings black, running into dark brown. In the hind wing the fulvous or ochreous colour is deeper, running into dark olive-green in the lower part of the wing. The under side of the fore wing resembles the upper surface, only lighter, and the tips are of a silvery green. The hind wings are marked with varied shades of silvery green.

H. H. Tilney Bassett.

Houghton Rectory, Blandford,
Oct. 10th, 1896.

VANESSA ANTIOPA.

By W. F. Kirby, F.L.S., F.E.S., &c.

It has been asserted by most authorities on British Lepidoptera for the last century, that British specimens of the Camberwell Beauty have much whiter borders than Continental ones; but I find that of late years an opinion is growing up, and is becoming openly expressed, that this is not the case, and that our British white-bordered specimens are only faded or hibernated. The white-bordered form is not unknown on the Continent, but seems to be very scarce in many localities; while, although the yellow form is not quite unknown with us, it is so rare (not more than two or three having been recorded) that I am inclined to regard its occurrence in Britain as purely accidental. It would be very desirable to ascertain the proportion of white- to yellow-bordered specimens in different parts of Europe; but I am not aware that anyone has investigated the subject. American specimens, again, on the average, are larger, and the border is more deeply coloured than in Continental ones. During the present autumn, it is interesting to learn that several specimens of this butterfly have been taken in Forfarshire, the Isle of Skye, and other localities in Scotland, and have been recorded in the 'Field' and elsewhere. Two of these were taken by Mr. W. R. Ogilvie Grant, who has kindly allowed me to examine them, and the borders are *snow-white*. As they are fresh specimens, the question of hibernation or fading is hardly admissible. Mr. C. W. Dale, in his 'British Butterflies,' pp. 157–162, has given a series of quotations from various English authors relating to this butterfly. I have turned up several of the older writers, and find that Donovan (1794) seems to be the first author who speaks of the specially white borders of English specimens. Only two authors figure it with yellow borders. Wilkes's figure is probably taken from a Continental specimen, for he says that he only knows of two British specimens, but that it is very common in Germany. Harris describes and figures the border as pale yellow, from a British specimen. Otherwise all the figures and descriptions which I have seen, by British authors, represent the border as *white*, though some say "dirty white." Mr. Dale is, however, in error respecting the use of the names *hygiæa* and *lintneri*, the first of which, he says, denotes the white form, and the other the American form. The former name was originally used to denote *two* forms of *V. antiopa*, one with white and one with yellow borders. Dr. Staudinger has since restricted the name to the aberration with very broad yellow borders, involving and nearly obliterating the area usually occupied by the blue spots. In the equally rare American aberration described as *lintneri*, the yellow border is still broader, and the blue spots are entirely absent. I may remark that the white borders of genuine British *V. antiopa* —like Mr. Grant's specimens, and the fine series in the British cabinet at the British Museum (Mr. Buckler's yellow-bordered specimen in the British Room is believed to have been bred from a larva received from Leipzig)—have a very different appearance to the borders of faded Continental specimens, which once were yellow. There are only three specimens with white borders in the general collection of the Museum; *two from Bhutan, and one (dirty white) from Japan.* Pryer, however, figures a Japanese specimen with a clear yellow border. Mr. Barrett suggests that the white-bordered British *antiopa* may come from Norway; Linné describes the border as "albidus"; and I should not be surprised to find that, outside Britain, the white-bordered form is more or less of a mountain insect. Dr. Lang says that Albanian specimens have white borders.

British Museum (Natural History), Oct. 15th, 1896.

CALOPHASIA PLATYPTERA, Esp.: A MOTH NEW TO BRITAIN.

On Sept. 14th last, whilst searching for land-shells near Brighton, I had the pleasure of capturing a male specimen of *Calophasia platyptera*, Esper. When I first saw the moth it was in excellent condition, but unfortunately, in consequence of not being prepared for taking new Lepidoptera, it had to be consigned to a match-box. The fringes have suffered somewhat, otherwise the insect is uninjured. I am pleased to say this pretty addition to our fauna will find a place in the collection of Mr. F. H. Briggs, of Lynmouth, Devonshire.

In appearance our new moth is like a small "shark-moth" when at rest, to which group it belongs. The genus *Calophasia* is closely allied to *Cucullia*, and in our present arrangement will precede it. I believe if the locality is carefully worked other specimens will be found. In searching for *C. platyptera* the habits of *Cucullia umbratica* should be remembered, which will aid in attaining success. A full account of the capture and description, with figure of the specimen, appears in the October and November numbers of 'Science Gossip' for this year.

John T. Carrington.

1, Northumberland Avenue, London, W.C.,
October, 1896.

ON THE VERTICAL DISTRIBUTION AND DERIVATION OF THE RHOPALOCERA IN THE PYRENEES.

By W. Harcourt-Bath.

On the occasion of a recent entomological expedition to the Central Pyrenees, part of my programme consisted in defining the vertical zones of vegetation, to provide a basis for studying the vertical distribution of the Rhopalocera in the region under consideration. The results arrived at, together with certain other facts and conclusions obtained during the course of the investigation bearing directly upon the subject of vertical or climatal distribution, I propose to present to the readers of the 'Entomologist' in the present paper.

The district investigated consists of that portion of the chain situated within the French Department of the Hautes Pyrenees, and may perhaps be regarded as representing the average climatal conditions of the whole range. On account of its central situation the precipitation is less than that further to the west, and greater than that which occurs in the continuation of the chain in the direction of the Mediterranean, which latter portion possesses a very dry climate indeed. The flora of this region is in character similar to that occurring on the northern slopes of the Alps, and in Cold Temperate Europe generally.

The olive zone (or, as it ought more properly to be called in this district, the pseudo-olive zone) is theoretically represented (from a climatological point of view) in the Department of the Hautes Pyrenees at the lower elevations, where the mean annual temperature rises in some situations as high as 59° Fahrenheit, but practically (from a phyto-geographical standpoint) this is not the case, for, as I have already stated, the vegetation is wholly that of Northern Europe. The olive and other characteristic trees and plants of the warm temperate zone just commence to occur in one direction about ten or a dozen miles to the east of the Department in the vicinity of Bagneres de Luchon, and in another as soon as we cross the southern watershed and descend into Spain. Theoretically this zone terminates here at about the altitude of 1000 ft., but of course there is no phyto-geographical line of demarcation between it and the one above, so that if we are to admit it at all it can only be estimated by means of a calculation.

The vine zone rises above the preceding to the height of about 1800 ft., which altitude is also considerably below the theoretical elevation it should be, based upon the mean annual temperature alone. It is, however, consistent with the conditions which exist in the zone below.

Now what are the causes of these apparent incongruities? That nature refuses to be bound by the rules of geographers, and conform with mathematical precision to the calculations of physicists, without taking all the factors into consideration, is plainly patent. The theoretical (climatological) zones defined by geographers harmonise very well on the whole with the actual (phyto-geographical) zones adopted by botanists throughout the world, and Europe in particular; but when our attention is confined to a small area, they are often found to be inconsistent in detail. It is clearly evident that other factors should be taken into account besides the mean annual temperature in estimating the horizontal and vertical limits of the vegetation. In many cases the minimum winter temperature or the maximum summer temperature has to be provided for, and this I consider furnishes the cue to the reason why the vine does not ascend to such a height in the Hautes Pyrenees as it ought to do from the point of view of the mean annual isotherm alone. Its non-occurrence above the altitude of 1800 ft. is in my idea to be accounted for by the temperature of the summer, beyond the elevation at which the plant is successfully cultivated, being insufficient to permit of the fruit ripening. A good deal of rain falls in the region in question in the summer and autumn months, which is probably the cause of the temperature being insufficient to bring the grape to perfection; hence the reason why it is not grown.

In the case of many indigenous species of plants and shrubs belonging to the warm temperate zone being unable to extend the area of their distribution even to the lowest elevations in this district, where the winter temperature is comparatively very mild, the same influence possibly operates as with the vine, the low temperature of the summer being likewise insufficient to ripen the seed, and thus not enable them to propagate their species. Perhaps it is also partially to be accounted for by their inability to compete with the more vigorous cold temperate forms which, thriving superabundantly by reason of the profuseness of the precipitation, do not afford a chance to the arid-loving forms from the southern and north-eastern sides of the Pyrenees to continue their kind.

The fauna, and particularly the Rhopalocera, of the pseudo-olive zone in the Hautes Pyrenees appear to coincide in their distribution with the flora very well. The butterflies even at the lowest elevations, with a few trifling and unimportant exceptions, partake wholly of the character of the north temperate region. It is possible that the reason of this lies in large measure in respect to the distribution of their pabula; in other instances species may be influenced directly by the amount of the precipitation, and by the temperature, in the same way as the plants.

In this connection I may here remark that in all the zones in the mountains (the same as in the Alps) it is singular how closely the distribution of the Rhopalocera coincides with that of the predominant or typical arborescent vegetation. This is particularly noteworthy by reason of the fact that very few trees and shrubs which constitute the facies of the different zones provide the pabula of the larvæ. Many low plants, on the other hand, which do constitute the food of the caterpillars, possess a wide distribution, or are represented in other zones by closely allied species. Besides the vegetation, the climate and many other factors it is evident, therefore, must be taken into consideration in order to account for both the horizontal and vertical distribution of the Rhopalocera.

The lower hill zone rises in the Hautes Pyrenees to the height of about 3000 ft. The alien but graceful locust-tree (*Robinia pseudo-acacia*) flourishes in this region, growing luxuriantly by the sides of the ravines and gorges in company with other characteristic vegetation.

The upper hill zone ascends above the preceding to the height of about 4500 ft. The most characteristic shrub belonging to it is the box, which grows in dense masses among the rocks upon the rugged mountain slopes, and produces a very typical feature in the landscape.

The lower alpine zone lies between the altitudes of 4500 and 6500 ft., but it is exceedingly difficult in many parts of the mountains to define its position with a certainty owing to the absence of conifers, which constitute the typical arborescent vegetation of this region in the Alps, and throughout sub-Arctic Europe generally. The places of the pine and fir are thus frequently occupied by the juniper and rhododendron, which, owing to the scantiness of the soil, flourish abundantly in the absence of the trees. It is thus often by no means an easy matter to tell where this region ends and the one above begins.

The upper alpine zone is the region of small bushes and stunted shrubs, and occupies the mountain slopes between the altitudes of 6500 and 8000 ft.

The snow zone, which occupies the highest and final vertical region, terminates at the point where commences the actual line of congelation, which on the northern slopes of the chain lies at about the altitude of 8800 ft.

On the southern or Spanish side of the watershed bounding the Hautes Pyrenees all the above vertical zones are a few hundred feet higher, the altitude of the lower limit of perpetual snow being about 9200 ft., this constituting a difference of some 400 feet.

Allowance being made for the difference in the latitude—about two degrees—between the Alps and the Pyrenees, the vertical distribution of the Rhopalocera in the latter range appears to approximate very closely to that of the former, in support of which I could furnish abundant proof. It is not, however, my intention in the present paper to enter into detail; this perhaps I may be persuaded to do in some subsidiary paper on the same subject later on. I propose here to deal with general conclusions only.

One interesting fact which has struck me, in making a comparison between the Rhopalocera occurring at the higher altitudes in the Pyrenees with their relatives in the Alps, is the comparative less number of melanochroic or alpine forms accompanying the type, or taking their place, than in the latter range. Two theories may be put forward to account for this: 1, that the lowland or Austral types, which possess representatives in the higher zones in the Alps through being recent immigrants to the Pyrenees, have not had sufficient time to develop them in the latter range; 2, through competition being less severe or conditions less varied than in the Alps. The former seems to me to be the best view to assume, but possibly both may be to a certain extent correct.

The number of species of Rhopalocera occurring in the Pyrenees is considerably less than that existing in the Alps, this difference being specially noticeable in the alpine forms; thus in the genus *Erebia* only about half as many species are found in the Pyrenees as there are in the great mountain range in Central Europe.

This deficiency probably dates back as far as the glacial period, and is to be accounted for by several hypotheses. In large measure it is undoubtedly due to the isolated position of the chain, coupled with the considerably less extent of area which it occupies in comparison with the Alps. To the glacial period, however, must be attributed an overwhelming influence in deciding the present distribution of the existing Rhopalocera fauna. The effect it has produced is probably very profound indeed. As the ice-cap slowly advanced over the plains and lowlands of France, the butterflies gradually receded further south, until they ultimately reached the region under consideration. Here their retreat was finally and effectually cut off by the elevated mountain range rising in their rear like a huge wall, and as the ice-sheet approached its base they were in consequence, like the rest of the pre-glacial fauna, unable to surmount the barrier, and were compelled to succumb to the increasing cold. Most of the alpine forms which exist upon the higher slopes at the present day probably owe their survival during the glacial epoch to the shelter afforded them in Spain at lower levels on the southern side of the range, while nearly all the lowland forms found in the region now are probably post-glacial immigrants from countries situated to the east.

In support of this theory may be brought forward the fact that the chain under consideration, by reason of its peculiar physical configuration, proves an effectual barrier to the dispersal, north and south, of lowland forms existing on the lower slopes upon either side. Unlike the more elevated mass of the Alps, there are no transverse valleys and passes at a comparatively low elevation which would provide the passage to and fro of such Austral or lowland types. All communication between France and Spain is thus completely severed, except in the case of those species existing in the immediate vicinity of the snow-line. Spain similarly in proportion to its southern latitude possesses a comparatively poor Rhopalocera fauna. In this case, however, less is possibly to be attributed to the effects of the glacial period than to the isolated position occupied by the Iberian peninsula; at the same time it undoubtedly has made its influence felt to a great extent.

At about the climax of the glacial epoch geologists assert that the land connection between Southern Spain and the northern parts of Africa was severed, and has been so ever since. This theory entirely accounts for why so few species inhabiting the southern shores of the Mediterranean have been able to extend their area of distribution to the north, where they could easily find a congenial home in the subtropical climate of Andalusia. At the same time no alpine forms inhabiting Europe, I believe, are found upon any of the mountains in North Africa. This would seem to suggest a date anterior to the climax of the glacial epoch for the discontinuity of the two continents. Geologists suppose that when the ice-cap attained its greatest dimensions the climatological and phyto-geographical conditions of the South of Europe must have been very similar to those which reign supreme in Scandinavia at the present day. If this was the case it must have harboured many of the alpine forms of butterflies existing then. So that, unless the discontinuity between the two continents did not take place at a date anterior to the climax, I do not understand the reason why some of them should not be retained at the present day at high altitudes upon the Atlas Mountains in Morocco and Algeria, to whence they would have retreated upon milder conditions ensuing. For if the disconnection took place before the climax, when the climatological conditions were not so severe, the alpine butterflies would not have retreated sufficiently far south in order to secure a foothold upon the African continent. The only other contingency I could see is that these conditions were not quite so severe at the climax as geologists have pictured, which is indeed supported by the fact that very few alpine forms occur upon the elevated chain of the Sierra Nevada, in the extreme south of the Iberian peninsula.

Another important item to be taken into consideration in order to account for the comparative paucity of the Rhopalocera fauna of Spain is to be found in the extreme infertility and aridity of a large portion of its surface. If similar conditions prevailed at the time of the glacial epoch, it must have told severely against the survival of many forms which entirely depended upon its southern sanctuary for their propagation. Upon milder climatic conditions ensuing, the remnants advanced up the slopes of the Pyrenean chain to their present stations. It will thus be seen that the alpine forms occurring in the range must have been in large measure indirectly derived from Spain. The most curious thing about it is that there are so few endemic species and peculiar varieties occurring in consequence throughout the chain.

It is evident that many factors must be constantly kept in view in estimating the why and the wherefore of the present distribution and derivation of the Rhopalocera in the Pyrenees.

Birmingham, October 1st, 1896.

ON JUMPING COCOONS FROM S. AFRICA.

By D. Sharp, M.D., F.R.S., &c.

At the last meeting of the Cambridge Entomological Society, Mr. Rickard kindly gave me two small oval objects known as "jumping cocoons." He had brought them from S. Africa some years previously, his attention having been attracted to them there by the fact that these apparently inanimate, earthen-looking objects execute considerable leaps, even managing to spring out of a small vessel, such as a tumbler, in which they may be placed. Some of the insects had emerged from the cocoons during the voyage from Africa to England, but Mr. Rickard had not preserved any of them, and all he recollected was that they were flies that hold their wings in a roof-like position. As the two cocoons given to me were intact, it was probable that they contained some remains, and I consequently investigated them with the hope of discovering something unusual that would explain the powers of jumping. I discovered inside what certainly is one of the most interesting pupæ I have ever seen. The order of insects to which it belongs is somewhat uncertain, but I consider it will prove to be an anomalous lepidopterous insect allied to Trichoptera.

But first as to the cocoons. These do not look like the cocoons of Lepidoptera, their appearance being that of a small piece of oval pottery, 5 mm. long, with a rough surface. They have a considerable thickness, and when broken open the inside is like the outside, though rather less rough; there is no silken lining, no polished surface. In each of the two cocoons I found a pupa; the two were quite similar, and I have no doubt belong to the larvæ that made the cocoons. They are of a highly anomalous nature, and agree in certain respects with the pupa of *Micropteryx*, whose discovery was recently made by Dr. Chapman, though very different in other points. There are these distinctions: 1, there are no free mandibles; 2, the ventral aspect is that of an anomalous pupa incompleta of Chapman, while the dorsal aspect is that of the Neuroptera, either of Hemerobiid or Trichopterous kind, but highly peculiar. The appendages on the ventral aspect are imperfectly fastened to the body, but the wings extend quite to the extremity of the body, and are free, as to their edges, on the dorsal aspect. The front of this soft imperfectly chitinised pupa bears a hard projecting chisel, which differs from all the rest of the pupal surface in that, instead of being pallid and membranous, it is dark, hard, and strongly chitinised. The dorsal aspect of the abdomen is *sui generis*, for though soft it is thrown into several series of ridges or folds, each of which bears a projecting, chitinous, acuminate tubercle; the structure of this dorsal part of the abdomen indicates great mobility of the segments on this aspect of the body. There are seven of the rows of ridges, 8–12 in each row; the longest and strongest are curved backwards. The most remarkable of all the features of this pupa is that the pleura of the abdomen are developed as large free flaps, which bear numerous long and strong setæ. There are also a few long setæ projecting from other parts of the body.

With these data we can make a fair guess at the *modus operandi* of the insect. This little pupa is shut in a remarkably hard thick cocoon without any orifice, and it has to get out. Nature has not provided it with caustic potash for the purpose, but has endowed it with a mechanism of complex perfection to accomplish this little object. On the front of the head it has a sharp chisel edge, and with this it has to cut through the pottery; contracting itself to the utmost in the posterior part of the cocoon, and retaining itself in this position by the hooks on the mobile part of the body, it is in a condition of elastic tension in consequence of the other side of the body being so differently formed and immobile; therefore, releasing the hold of the hooks, the pupa is discharged forwards, and the chisel piece strikes the front part of the cocoon; repeating this an enormous number of times a circle may be gradually inscribed on the inside of the far end of the cocoon, which gives way when sufficiently weakened, and the insect becomes free. In both the specimens the inside of the cocoon is about half-cut through; either this is done as the result of a prolonged series of wriggles, or of shocks such as I have described. It is by no means improbable that the early part of the performance is carving the groove by wriggling, the later part knocking it off by jumping against it. The pleural setæ are doubtless the sense organs that co-ordinate the movements.

In order to rear this insect successfully it is clear that the cocoons should be fixed. I therefore venture to suggest that anyone having the opportunity should take a strong flat piece of card; make some little holes in it, and then, by means of Leprieur's gum, *used very thick* so as not to penetrate the cocoon, secure one side of each cocoon in one of the card hollows, and they will then probably facilitate the exit of the imago.

As to the order to which the insect belongs, I may remark that, as the pupæ inside the cocoons were both mouldy and dirty from exudation, they had to be cleaned, and in order to see some points of the structure I separated the abdomen of one of the pupæ from the rest of the body; in doing so I wounded the delicate integument of the wing-sheaths and leg-sheaths, and I find that these contain a profusion of scales of peculiar form, but no doubt, I think, of a lepidopterous nature. The antennæ are very long, with free tips; and altogether I consider that the insect will prove to be an anomalous lepidopteron, possibly somewhere near to *Adela*.

Mr. Rickard informs me that he obtained these cocoons at Shark's River, three miles west of Port Elizabeth.

Cambridge, Oct. 17th, 1896.

NOTES AND OBSERVATIONS.

Rearing Acherontia atropos.—In reply to Mr. Walker's query (*ante*, p. 311) as to rearing this insect, I may say that I believe it to be extremely sensitive during the resting stage underground previously to becoming a pupa, a period which, in the case of the larvæ I had, was about three weeks. These larvæ did not make cases of a solid character, but each one, about an inch or two below the surface, reduced the soil to a very nice uniform condition of fineness for an area of a quarter of an inch or more around itself; this prepared soil was only fastened together so very lightly that a very slight disturbance ruptured it. I wished to examine these specimens to see the condition in the resting stage, and in doing so I broke the earthen case of one, but put it together, as I thought, very nicely; a deformed pupa was, however, produced. I have no idea how the larva operates on the soil, but the pupa of *atropos* is excessively active with its abdominal segments, far more so than any pupa of its kind that I know of. The sixth to eighth segments of the pupa are very deeply impressed and ridged on each side, and this condition is correlated to the capacity of movement; for, though the sculpture I speak of looks quite shapeless, yet when the pupa is fully bent laterally, the largest ridge—close to the stigma—exactly fits to the side of the preceding segment. As to the condition in which Mr. Walker should keep his pupæ, I presume practical lepidopterists would say, out of doors.—D. Sharp; Cambridge, Sept. 29th, 1896.

My last communication to you has caused so many letters to me, from correspondents who cannot consult your previous volumes, that I am led to beg for space in your next issue, that I may shortly repeat my directions for forcing the pupa of *A. atropos*. I half fill a ten-inch garden-pot with sand, place on the top a layer of damp moss, lay on it the pupæ, and cover these again with another layer of moss; arrange some sticks round for the moth to climb, and cover with a bell-glass, as used by gardeners, to fit inside the rim of the pot. Put into a soup-plate containing water, and place the whole arrangement inside the dining-room fender, not too close to the fire, turning the pot round occasionally to equalise the heat, and adding more water to the plate when it gets low. If this is done at the end of October, the perfect insect may be looked for about Christmas. It generally emerges towards night, the pupa becoming dark and soft, and turning on its back shortly previous to the emergence.—H. W. Livett; Wells, Somerset.

In reply to Mr. Edward R. Walker's queries as to the best method of breeding this species, I have much pleasure in furnishing him with an account of the means I adopted some years ago with perfect success. I forget what year it was, but larvæ and pupæ of *atropos* were more than usually abundant. I went round to different fields where potato-digging was in operation, and showed the men drawings of both larva and pupa, and told them that I would give twopence each for any they might find. The consequence was that in a day or two I had a couple of dozen of larvæ and pupæ brought to me, and had to tell the men that I did not want any more. The larvæ were nearly all full grown, and went down in a few days. I had endeavoured to breed this species the previous year, but had failed altogether; so I thought I would try some other plan. When the larvæ had been underground for three weeks I dug up the pupæ. I then procured a large flower-pot, filled it half full of gravel, upon which I placed a layer of damp moss, about two inches thick, and upon this the pupæ, covering them with another layer of damp moss about an inch thick. A piece of muslin was then tied over the top, and the pot placed on the kitchen mantelpiece. Twice a week the layer of moss above the pupæ was taken out, plunged into a basin of tepid water, wrung out, and replaced. The moths began to appear in about a month's time, and from twenty pupæ thus treated nineteen moths appeared, only one being a cripple. A day or two before the moths emerge the pupæ begin to change colour, until they become nearly black, and at this period feel very soft to the touch, and, if handled a few hours before hatching, the moths may be heard squeaking within. I believe that I sent an account of this at the time to the old 'Entomologist's Weekly Intelligencer' [vol. v. p. 69, Nov. 27th, 1858].—Gervase F. Mathew; H.M.S. 'Hawke,' Salonica, Oct. 14th, 1896.

We have just had the pleasure of successfully rearing an imago of *A. atropos*. The larva (from Northamptonshire) pupated about Sept. 15th. On the 27th we placed the chrysalis in the forcing apparatus designed by Mr. Sturt, which was described in the 'Entomologist' for July by Dr. Guard Knaggs. The moth—quite perfect—emerged on October 15th, after being in the "incubator" for eighteen days, the water being kept at about 105°.—A. R. and R. H. Heath; Willesden, Middlesex.

Vanessa c-album.—Mrs. E. S. Hutchinson (*ante*, p. 312) claims to have first discovered the light form of this butterfly in England. With due respect permit me to say that I never attempted to claim this discovery. What I do profess to have discovered is that it only occurs as an aberration of the first generation in the season in this country. In conformity with the law of priority in nomenclature I am quite willing to substitute the name of "*hutchinsonii*" for that of "*lutescens*," if your correspondent will kindly inform me where a definition of the form under that cognomen was published, and if it is one of the magazines or works recognised by the editors of the 'Zoological Record.' With regard to the results obtained by breeding the larvæ of this insect in captivity, they prove nothing; and Mrs. Hutchinson appears to miss the most important point, in referring to the same, in her omission to mention the environment of the caterpillars, whether they were reared indoors or out of doors, and what was the temperature previous to the emergence of the imago. It is well known that very different results can be obtained by rearing Lepidoptera under artificial conditions to what is the case in a state of nature. In support of this I may say that a larger proportion of the light form of this butterfly are produced in captivity than at large in a state of freedom, as I have had ample opportunity of proving. What I should much like to know from your correspondent is the relative proportions between the two forms occurring in a state of nature each season for a number of years back, and the climatological conditions prevailing at the same time.—W. Harcourt-Bath.

Uniformity in Pinning and Setting Lepidoptera.—In the course of this interesting discussion in seems surprising that no one has suggested as a remedy for the existing state of things the disestablishment of the pin in its present form. However well pinned an insect may be, it must be admitted that it would look far better if there were no pin visible at all. As a substitute I would suggest the adoption of a small double prong, something in the shape of a reaping-hook; the part representing the handle would end in a point, and would stand vertically in the cork; from this would diverge two arms like those of a capital Y; these would each curve over until they ended in a horizontal direction in two points, which would be inserted at the side of the thorax, underneath where the wings join it, and thus in the set specimen the apparatus would be totally out of sight. The advantages of some such contrivance as that which is here rather lamely described would be considerable. In the first place, the beauty of the thorax in many species would not be spoilt as is at present inevitably the case; secondly, the specimens would be well raised above the paper and out of the way of mites, while at the same time they would not stand so high as to give what most English collectors consider the ugly effect of high-setting; besides this the absence of a pin through the thorax would give a more natural effect to a set specimen. Setting might with this arrangement at first present difficulties, but they would probably not be insuperable. Insects would be moved by clasping the upright part of the apparatus with forceps. The size of the new pins could be regulated in the way suggested by Mr. Tunstall in the last number, though it would probably be best to keep all specimens at the same height. — D. P. Turner; Tonbridge, Oct. 6th, 1896.

There is no doubt some general rule should be laid down for the above, especially for collectors of British Lepidoptera. Exotic collectors are so few and far between that I think they might be left to fight their own battles. But who likes to see British insects set flat? Insects so set are classed "continental" at once. Who among the collectors who give long prices for insects (because they are caught this side of the Channel) would look at such insects on long pins, set flat? I think everyone will agree with me that flat-setting is ugly, wooden, and contrary to the laws of nature—therefore unnatural. A drawer of flat-set Lepidoptera always look to me as if they were made of paper. I suppose this is because one is accustomed to see them so in pictures. Of course I understand one principal reason is to show as much of the wing as possible, but there is nothing to prevent collectors having one or two specimens so set (my remarks refer more especially to those who have a long series); there is surely no necessity to set all flat. Let any who have doubts go and look at Hewitson's magnificent collection in the Museum, and compare it with a German collection.—Walter Dannatt; Ivy Dene, Westcombe Park, S.E.

Entomologist *v.* Collector.—Mrs. E. S. Hutchinson (*ante*, p. 313) publishes a very indignant note respecting the imaginary discourtesy of those who denounce the "mere collector." I fail, however, to see what courtesy and discourtesy have to do with it, but consider it more a matter of truth and logic. If a person possesses a pronounced opinion upon any subject, and has the courage of his convictions, I do not see that he deserves to be denounced as being discourteous, unless, of course, he published his opinions with the direct purpose of causing anybody annoyance. It is a matter entirely concerning principles instead of personalities. Your correspondent recommends the Rev. W. Claxton to "note" those who are so discourteous as to condemn the "mere collector." Well, I can supply the first instalment to the list, in the name of that great and highly respected entomologist, the late H. W. Bates, who professed a profound contempt for the "mere collector" (see 'The Life and Letters of Charles Darwin'). — W. Harcourt-Bath.

May I be allowed a few remarks on Mr. Claxton's note and the Editor's reply, pp. 286–7? I think that most of us rather despise those who form collections of pictures without in the least being able to appreciate their merits. So also with collectors of insects; it is reasonable, I think, to expect them to collect intelligently, and so far to be scientific. But it seems to me absurd to suggest that the ordinary untrained individual can do nothing for science in the course of his collecting. The great need of Entomology at the present day is intelligent field-collectors, who will notice and record what goes on before them; people who can see things that are not mentioned in their text-books. Such observers should be aided by those whose training and knowledge of the literature enable them to pick out the new and valuable points in the observations. I have lately published a good deal on wild bees, and anyone who will look at my papers will see that nearly all contain references to assistance received from young people who have no special knowledge of Entomology,—some of them children. We have on foot a movement to interest the children in all the schools of New Mexico in natural history, and at the same time make them useful workers in the cause of science. It is just as easy to be scientific in this sense as to collect unintelligently, and a thousand times more delightful. To prove my point, I will by letter suggest a course of study to any collector who will follow it and report results after six months. He should state where he will reside, what he is collecting, and how much time he has to collect in.—T. D. A. COCKERELL; Mesilla, New Mexico, U.S.A., Sept. 6th.

THE GEOGRAPHICAL VARIETIES OF PARNASSIUS APOLLO.—Why should not the different geographical varieties of this fine butterfly receive cognomens? This degree of variation ranks next in importance to the type, and is by far more worthy of distinctive recognition than either a seasonal variety or an aberration, for it is practically an incipient species, which the other forms have not so much right to be called. Taking the prevailing form found in the Alps as the type, we have in the Pyrenees a well-marked geographical variety, consisting in the lighter colouring of the male and the darker colouring of the female, the sexual dimorphism thus being very pronounced, which is due to the disappearance and development of the black scales respectively. The male is especially distinguished by the almost total suppression of the dusky patch near the angle of the inner margin of the posterior wings, and in the almost total absence of the submarginal wave-like bands, particularly in the posterior pair. In this latter particular it is the antithesis of the form found in Scandinavia which possesses this wavy band of dusky scales very pronounced. The form occurring in the Alps seems to be intermediate between the two, and it possesses aberrations bearing a resemblance to them both. On the other hand, the Pyrenean form possesses occasional aberrations approaching the alpine type. The specimens from Siberia are larger, according to various authorities, but I do not know in what other particulars they differ from the type. In this connection I may remark that the specimens of this insect which I have taken in the Jura are larger than the type from the Alps, and seem to be an approach towards the Siberian form. I beg to suggest that the three geographical varieties which I have defined be respectively called *pyrenaica*, *scandinavica*, and *siberica*. It is very possible that the form found in the Caucasus is worthy of a varietal cognomen, but I have not seen any specimens from this region. All the specimens of *P. apollo* from the Alps, the Pyrenees, and the Jura may be divided into two sets according to their tints, in one of which it is of a delicate cream colour, although in the majority of specimens it is white. Altitude does not appear to have anything to do with it. I should like to suggest the name *pulchella* for the cream-coloured form.—W. HARCOURT-BATH.

MELITÆA DIDYMA *var.* ALPINA.—This melanistic variety appears to possess a wide area of distribution in the mountain ranges of Europe, for, in addition to the Alps, I have encountered it in the Pyrenees, besides seeing it in a small collection of Lepidoptera from the Caucasus. In the Alps it occurs at a comparatively low elevation, having been found by me in abundance a little below the altitude of 2000 ft. It does not appear to be so common in the Pyrenees.—W. Harcourt-Bath.

Committee for the Protection of British Lepidoptera in Danger of Extermination.—The first meeting of this Committee, appointed by the Entomological Society of London, was held at the Society's Rooms, on Oct. 14th, 1896, Professor Meldola, President of the Society, in the chair. Letters from the City of London Entomological and Natural History Society, the North London Natural History Society, and the Leicester Literary and Philosophical Society, expressing warm sympathy with the object of the Committee, were read. After discussion of the best methods of securing the objects of the Committee, it was resolved to invite information as to species in special danger of extermination, with a view to future action.—Chas. W. Barrett, Hon. Sec.; 39, Linden Grove, Nunhead, S.E.

Corrections.—P. 296, Roman numeral **I** (accidentally broken off in printing) should begin first line of label. P. 310, line 3, Miss G. E. Ormerod was born December 23rd (not July 23rd), 1823.

CAPTURES AND FIELD REPORTS.

Larvæ of Calligenia miniata eating Imagines of the same Species.—I had a batch of the larvæ of *C. miniata*, and some of them have already attained the perfect state, whilst others are still feeding. The most remarkable thing, however, is that the larvæ have seized on and devoured the moths, although they were well supplied with their proper pabulum in the shape of lichen. In attacking the moths the larvæ fasten on to the top of the wing, and then proceed to eat the head and wings first and afterwards the thorax and body.—C. J. Boden; 204, Hanover Buildings, Tooley Street, S.E., Sept. 12th, 1896.

Aporia cratægi in Kent.—I have the pleasure to record the capture of this insect, which as a British species is I believe almost extinct, in a locality in Kent where it has previously been taken and recorded. I do not care to give the exact locality, believing it to be the only one in England where the butterfly now occurs, for if it became generally known the species would undoubtedly in a very short time be exterminated. I may say that the insect is confined to an area of about a few hundred square yards.—H. Douglas Stockwell; 2, Albert Road, Dover.

Chœrocampa nerii near Dartmouth.—I was paying a visit to a Mr. Owen, who was then living at Stoke Henning, near Dartmouth, in September, 1892, having been asked down to make the acquaintance of one of his boys who had a strong taste for Entomology, and to whom I had sent now and then duplicate butterflies and moths. On seeing him almost the first words he uttered were, "What *do* you think, Mr. Morres, we caught the other day on the honeysuckle on the verandah—an oleander hawkmoth!" On seeing me look rather incredulous he brought it to me on the setting-board, when it proved a fine specimen of *C. nerii*, and of an unusually dark colour, at least many shades darker than some half-dozen specimens that I have hatched out since then from larvæ taken in the Nerira Valley between Ventimiglia and Bordighera, in N. Italy. On writing last week to my friend about it, he replied, "The weather had been warm and foggy; and for several nights we had noticed a large moth come to the honeysuckle over the verandah; it had a very strong flight, and would not be caught. At last my father succeeded in taking it; but its back was a little rubbed in putting it into the smelling-bottle. The colours are as fresh and bright now as when it was taken." I would add, however, that the injury was so slight as not to damage it as a cabinet specimen.—(Rev.) ARTHUR P. MORRES; St. Nicholas, The Close, Salisbury, Sept. 19th.

LYCÆNA ARGIOLUS.—I do not know whether this butterfly has been generally abundant this season; but in places I have visited it has been exceptionally so. When in Carmarthenshire I found it, the latter part of April and in May, unusually common. Again, in parts of Somersetshire in July the second brood might be seen in town gardens, in lanes over hedges at the bramble-blossom, and the outskirts and open spaces of woods. There appeared to be a large number of female specimens often flitting over the ivy and visiting the bramble-bloom. I watched those on the latter on several occasions, but they appeared only to be attracted by the sweets thereof.—T. B. JEFFERYS; 17, New King Street, Bath.

LEUCANIA EXTRANEA.—I have the satisfaction of recording the capture by myself of *Leucania extranea*, at sugar, in the New Forest, on Oct. 8th. The specimen is a good one, slightly smaller than the illustration given by Newman.—(Rev.) GEOFFREY HUGHES; Woolston Vicarage, Oct. 15th, 1896.

VANESSA ANTIOPA IN OXFORDSHIRE.—As I was taking a constitutional along the Oxfordshire side of the Thames on Sept. 7th, I had the pleasure of seeing a fine specimen of *Vanessa antiopa* sail close by me, and settle on the end of a lower branch of a large elm, within about two or three feet of where I was. Not having my net with me, I failed to capture it, although I tried to do so with my hat.—W. BARNES; 7, New Road, Reading.

VANESSA ANTIOPA IN LINCOLNSHIRE.—On Friday, September 11th, at the Manse, Bracebridge, Lincoln, I took a perfect specimen of *V. antiopa*. It was sitting on the raspberries, and near some plum trees, the fruit on which was then over-ripe.—G. M. ELLISON; Bilton Grange, Rugby.

AVENTIA FLEXULA AT CHICHESTER.—On June 23rd I captured a freshly-emerged *Aventia flexula* here, in quite a different locality to that in which I took the specimen recorded by me last year. It is singular that this moth appears to be met with only singly. Although the place was frequently visited and well-worked subsequently, not another specimen could be found. Perhaps some of the readers of the 'Entomologist' may be able to give information respecting the habits of this interesting moth, which may aid in the capture of more specimens next season.—JOSEPH ANDERSON, JUN.

COLIAS EDUSA AT CHICHESTER.—I know of only one specmen of *Colias edusa* being seen here this season.—JOSEPH ANDERSON, JUN.

SIREX JUVENCUS AND S. GIGAS AT CHICHESTER.—Two specimens of *Sirex juvencus* and several *S. gigas* have been taken in this neighbourhood this autumn.—JOSEPH ANDERSON, JUN.

HELIOTHIS ARMIGERA IMPORTED WITH TOMATOES.—On June 4th I received about twenty nearly full-grown larvæ that had been found among Valencia tomatoes. They were very combative in confinement. The larger seize the smaller ones, and throw them two and three inches away. They were kept out of doors. I touched one with my little finger; it turned sharply round and bit me, causing slight pain, but did not break the skin. The surviving larvæ had all gone down by June 17th. I reared only seven moths; they appeared on July 17th, 18th, 19th, 20th (two), 21st, and 25th. On Sept. 24th I received one larva (second brood, I suppose) which had been imported with Lisbon tomatoes.—J. ARKLE; Chester.

RHOPALOCERA IN ESSEX.—On July 19th I saw five *Euchloë cardamines* (males) flying along the railway bank off Leigh, all in good condition. On the same date *Vanessa polychloros* was fairly common between Southend and Shoeburyness; but as they kept well out of reach I was unable to take any. I saw only one specimen of *V. io;* but *Pararge megæra* was plentiful, also *Hesperia thaumas.*—G. R. GARLAND; 94, Sedgwick Road, Leyton.

ABNORMAL SPECIMEN OF NEMEOPHILA PLANTAGINIS.—I should like to record the breeding of an abnormity of *N. plantaginis,* in which the hind pair of legs are replaced by miniature wings.—W. WOODWARD; 112, Northumberland Park, Tottenham, N., Sept. 10, 1896.

UROPTERYX SAMBUCARIA IN OCTOBER.—I was much surprised while passing a street lamp here, on Oct. 2nd, to see a specimen of *U. sambucaria* clinging to the glass. Mr. Bird mentions having bred this species on Sept. 17th (Entom. xxvi. 303). It seems therefore evident that in suitable seasons a certain proportion of the larvæ of *U. sambucaria* do not hybernate, but produce imagines the same year, as is the case with many other species which usually hybernate in the larval stage.—ALFRED SICH; Villa Amalinda, Burlington Lane, Chiswick, Oct. 5th, 1896.

EMERGENCE OF SMERINTHUS POPULI IN AUGUST.—I had a fine fresh *S. populi* sent me from Rhyl on Aug. 12th. It is a good-sized male, paler and much less strongly marked than the specimens which emerged in my breeding-pots on May 12th, 16th, 22nd, 23rd, and June 4th, 11th, and 25th.—J. ARKLE; Chester.

SMERINTHUS POPULI IN SEPTEMBER.—A female specimen of this species was taken at Macclesfield, in Cheshire, during the first week of September. She deposited a batch of infertile ova.—RICHARD SOUTH.

EMERGENCE OF EUPITHECIA PULCHELLATA IN AUGUST.—On July 23rd I picked about thirty full-grown larvæ from foxglove flowers in Delamere Forest. A fine imago emerged on Aug. 21st.—J. ARKLE; Chester.

PARASITES OF PACHNOBIA ALPINA.—I have just returned from Rannoch, and have bred, from infested pupæ given to me by Mr. Salvage, a male and female of an Ichneumon allied to, or a variety of, *Amblyteles uniguttatus,* Grav., and several of a *Pteromalus,* apparently a new species somewhat allied to *P. catillus,* Walk.—C. W. DALE; Glanvilles Wootton, July 6th.

HEMIPTERA-HETEROPTERA AT LIGHT.—Last year, at Offley, near Hitchin, on Aug. 22nd, during a heavy thunder-storm, a specimen of *Corixa striata* flew into a room, evidently attracted by the light. This year, during June, a species of *Psallus* (probably *varians* or *variabilis,* from an oak tree close by), and on Sept. 16th a specimen of *Lygus pabulinus* alighted on my book whilst reading by gaslight at an open window at Dulwich. Each of these three events took place between 9 and 10 p.m.—R. M. Leake; 15, Alleyn Park, W. Dulwich, S.E.

A Fortnight in S. Devon.—On Aug. 1st I started from home to join my friend the Rev. E. C. Dobrée Fox, for a fortnight's entomology on the coast of S. Devon. The weather was delightful all the time, and we had very fair success. Among our captures were *Lithosia caniola*, *Leucania albipuncta*, *L. putrescens*, *Hydrœcia nictitans*, *Caradrina ambigua*, *Agrotis puta*, *A. saucia*, *A. obelisca*, *A. lucernea*, *Plusia festucæ*, *Acontia luctuosa*, *Gnophos obscurata*, *Acidalia marginepunctata* (*promutata*), *Aspilates ochrearia* (*citraria*), *Ligdia adustata*, *Larentia olivata*, *Eupithecia subfulvata*, *E. oblongata* (*centaureata*), *E. pumilata*, and *Melanippe galiata*. Common moths were abundant, especially *Leucania pallens* and *Agrotis exclamationis* and *A. segetum*.—F. C. Woodforde; Market Drayton.

Rare Noctuæ in the Isle of Wight.—I have much pleasure in recording the capture of *Leucania vitellina* by Mr. John Hodges, at Freshwater, on September 8th; I saw the specimen shortly after capture, and Mr. Hodges was kind enough to add it to my collection. I was fortunate enough to obtain two specimens of *Leucania albipuncta* and four of *Caradrina ambigua* during my stay at the above-mentioned spot.—P. W. Abbott; Four Oaks, near Birmingham, Oct. 6th, 1896.

Captures at Lamp-light.—About 11 p.m. on the night of Aug. 8th last, while sitting in my "lamp" room here with my friend Mr. W. R. Ogilvie Grant, of the Natural History Museum, South Kensington, we received a most unexpected and extraordinary visitor in the shape of a skylark (*Alauda arvensis*). I need hardly say that, after being identified, it was promptly released, and, unlike many moths under similar circumstances, it did not try a second visit. It was a dark still night and we were taking a good many moths, though none of any note, *Noctua rubi* and *Pionea forficalis* furnishing nearly half the "bag." We imagine the bird was disturbed from its roosting-place in the meadow below the house by a moving cow or sheep, and then, dazzled by the light in the window, was compelled to fly towards it. I have captured bats, beetles, and other "outsiders" at lamp-light before, but never a bird! I have been taking both *Paraponyx stratiotata* and *Acentropus niveus* at the light in the same room. There is a small stream, now nearly dry, about two hundred yards from the house, but no marshy ground or river-side vegetation for some distance. I took altogether four *A. niveus*, three of them on one night (August 12th), and four *P. stratiotata*. A *Vanessa urticæ* came into the room on the night of August 4th. I was rather surprised at this, but my friend Dr. E. Wood, of Yalding, tells me that he has known one or two of these butterflies to come to a light before now. — Savile G. Reid (Capt.); The Elms, Yalding, Sept. 1st, 1896.

Acherontia atropos in England and Wales, 1896:—

Berks.—I have had six pupæ of the above insect brought to me this autumn, and have heard of many others being found. The previous records in my note-book are three larvæ, 1885; two pupæ, 1889.—W. E. Butler; Hayling House, Oxford Road, Reading.

Cheshire.—During the last month five larvæ and one pupa were brought to this museum from various parts of Cheshire, and I learn from my friend Mr. J. W. Roberts, of Barmouth, that several larvæ have been taken in his district.—Robt. Newstead; Grosvenor Museum, Chester, Sept. 29th. On Sept. 7th Mr. J. Lyon Denson, of Chester, showed me a full-grown larva of *A. atropos* taken about three miles from the city. This makes at least the seventh taken in the neighbourhood during the latter part of this summer and beginning of autumn.—J. Arkle; Chester.

Essex.—Several larvæ of *A. atropos* occurred in the neighbourhood of Dovercourt at the end of August.—Gervase F. Mathew.

Kent.—On August 17th a brother of mine found, at Hawkhurst, Kent, a very fine yellow example of the larva of *A. atropos;* it has since gone to earth. I have known of others taken in this neighbourhood at intervals since 1876.—J. Adams; 41, Whyteville Road, Forest Gate, E.

Lincolnshire.—Larvæ and pupæ of this beautiful moth appear to have been unusually abundant this year in the potato-fields in the Long Sutton district during August and September. Being there on August 17th, my brother from London met me, with a fine larva taken from the top of a potato barrel the day before in the Nine Elms Railway goods-yard. At an early hour on the 19th a boy brought me another fine one, picked up in the street opposite the police-station, both being of the yellowish tint, and both, when put into a flower-pot with earth, buried themselves at once in order to pupate, which they did. From the last-mentioned date up to Sept. 30th I have received over one hundred and fifty pupæ; several have died, either from the handling by the potato-pickers or bad packing during transit. I have this morning received another box of fifty, and am expecting more, so have already received upwards of two hundred.—W. Brooks; Grange Hall, Rotherham, Oct. 10th, 1896.

Sussex.—Larvæ of *Acherontia atropos* have been somewhat plentiful in the Chichester district again this season, the first being found on July 22nd, the last on Sept. 1st. On July 17th a fine moth—a loud squeaker—emerged from my last year's pupæ, of which I had eleven, and from which I succeeded in bringing out only three perfect specimens. I have had thirteen larvæ in my possession this year.—Joseph Anderson, Jun.

Rhopalocera from Colwyn Bay.—I spent the latter half of August at this fastly-increasing seaside resort, during which I was favoured with the most desirable weather. Although most of the species of Rhopalocera which I came across are more or less common, the following will show that Colwyn Bay is not a bad place for them, even towards the end of the season; in fact I have heard that nearly forty different species occur, or have occurred, in the immediate neighbourhood:—*Pieris brassicæ* and *P. rapæ*, very common; *P. napi*, extremely abundant; *Lasiommata egeria*, very abundant, especially on the borders of the Pwllycrochan Woods; *L. megæra*, abounds in almost every situation; *Hipparchia semele*, common among the rugged slopes of Bryn Euryn and on the Little Orme's Head (I have observed it resting in considerable numbers on the face of the bare rock); *H. ianira*, common everywhere; *H. tithonus*, fairly common; *Cænonympha pamphilus*, very common; *Vanessa atalanta* and *V. io*, a few newly-emerged examples seen; *V. urticæ*, second brood well on the wing; *Argynnis paphia* was over (I only saw one straggler); *A. euphrosyne*, one example only; *Polyommatus phlæas*, common; *Lycæna icarus*, extremely abundant; *L. agestis*, sparingly at Bryn Euryn, but common on the Little Orme.—Augustus D. Imms; Linthurst, Oxford Road, Moseley (near Birmingham), Worcestershire, Aug. 28th, 1896.

SOCIETIES.

South London Entomological and Natural History Society. — *August 27th*, 1896.—R. South, Esq., F.E.S., President, in the chair. Mr. Montgomery exhibited a beautiful xanthic example of *Epinephele tithonus* taken at Jevington on July 27th, all the usually black area being a rich dark fulvous. Mr. Auld, this year's results in breeding *Abraxas grossulariata* in the neighbourhood of Lewisham. Mr. Adkin, a head of flower-buds of ivy with ova of *Cyaniris argiolus* in sitû, and made some remarks upon the habits of the species. Mr. Manger, a specimen of *Eugonia polychloros* taken on May 24th at Brockley. It was suggested that the larva fed on poplar, as no elm was known to occur in the neighbourhood. Mr. Moore, specimens of *Papilio daunus* and *P. cresphontes* from St. Augustine's, Florida; also several specimens of the "walking stick," *Anisomorpha buprestoides*, which when seized will spurt a strong acid vapour from exceptionally large glands placed in the sides of the thorax. Mr. Mansbridge, a bred series of *Polia chi* from a dark female taken near Huddersfield. Several examples were dark, having all the lines, bands and markings of var. *olivacea*, but without any trace of the olive-green shade of that variation. Mr. South, two specimens of *Caradrina ambigua* taken by Mr. Woodford near Exmouth in July this year. The specimens were unusually pale and glossy. In answer to a question from Mr. Barrett, Mr. McArthur said that the larva of *Hadena adusta* spun its cocoon in the autumn, but did not turn to pupa till the spring. He had repeatedly found them at the roots of moss. Mr. Auld reported that var. *nigrata* of *Limenitis sybilla* had been taken in some numbers this year. He also knew of a specimen of *Polyommatus icarus* having no vestige of spots on the under side, and a var. of *Argynnis paphia* possessing a pale border and a dark centre. Mr. Turner had taken the second brood of *Zonosoma annulata* in N. Kent, and three specimens came to sugar. Mr. Adkin had spent a fortnight at Eastbourne, but had seen no *Colias edusa*. Mr. South's experience in Suffolk was of the same negative character. Mr. Mansbridge had heard that the species was to be taken on the east coast. Mr. Tutt during a month spent in S. France had seen but half a dozen, in fact it always appeared scarcer than *C. hyale* on the Continent. Mr. Tutt asked if there was any direct evidence that *Pyrameis cardui* hybernated as an imago. He had failed to find any authenticated record. In N. Africa Mr. Eaton had reported the larvæ as feeding during the winter. Mr. Barrett had seen imagines in late autumn and again in spring, but knew of no positive evidence of the species being found in winter.

Sept. 10th.—W. Mansbridge, Esq., F.E.S., in the chair. Mr. A. E. Hall exhibited a gravid female of *Termes bellicosus* from Cape Coast Castle, and a series of captured *Callimorpha hera* from Newton Abbot. Mr. Lucas, a female of *Platetrum depressum* having the male blue coloration, a male *Calopteryx virgo* having the right fore wing without the dark pigment, and a pair of the rare grasshopper *Thamnotrizon cinereum* from the New Forest. Mr. Montgomery, a bred series of *Dianthœcia capsincola* from Eastbourne; one specimen had a wide submarginal line and a marginal area without the wavy lines.

Sept. 24th.—C. G. Barrett, Esq., F.E.S., in the chair. Mr. R.

Adkin exhibited living larvæ of *Cyaniris argiolus* in sitû on the buds of ivy-blossom from Eastbourne, also full-fed larvæ of *Aplecta occulta.* Mr. Filer, a fine variety of *Enodia hyperanthus*, having the white spots surrounded by yellow rings only, the black rings being entirely obsolete; it was taken in Essex. Mr. Moore, specimens of *Thelyphonus giganteus*, a species midway between the scorpions and the spiders, from Florida, and contributed notes; also he showed specimens of *Polistes annularis* and a nest. Mr. Turner, a varied series of *Noctua xanthographa*, including a black form, a pale form, a red form, and a form with unusually well-defined stigmata; a very dark *Agrotis segetum* from Kent; a *Triphæna pronuba* with a remnant of a discoidal spot; and two bred *Acronycta aceris* with the veins of the secondaries deeply lined with black. Mr. Montgomery, specimens of *Noctua ditrapezium* from S. Yorks. Mr. Barrett, very long and varied series of *Tephrosia biundularia* and *T. crepuscularia*, and sought to establish the identity of the two forms. After considerable discussion it was decided to adjourn the matter for further consideration at the next meeting, to give members the opportunity of exhibiting their own series.—Hy. J. Turner, *Hon. Report Sec.*

Birmingham Entomological Society.—*July 20th*, 1896.—Mr. P. W. Abbot, Vice-President, in the chair. Mr. E. S. Haines, Danetree House, Stourbridge, was elected a member of the Society. Exhibits:—By Mr. R. C. Bradley, a specimen of *Sesia culiciformis* taken in his garden at Sutton. Mr. P. W. Abbot said that he believed it to be quite a new record. He had been taking the species, together with *S. cynipiformis*, in the larval stage at Wyre Forest, the latter species having been quite common in the oak stumps. He had also taken *S. cynipiformis* in Sutton Park a few years back. He had found larvæ in all stages and pupæ as well of *S. cynipiformis* at Wyre Forest all together last May. By Mr. Wainwright, *Chærocampa elpenor*, a single specimen taken by Mr. Herbert Stone this year at Marston Green. He said that he believed it was many years since the species was taken locally, though there used to be several localities for it, and he knew it used to be taken near to Marston Green about forty years ago. Mr. J. T. Fountain said that he had taken *C. elpenor* at Shirley. Mr. Wainwright also showed a nice series of *Criorhina asilica* taken at Trench Woods last May, when the species was common. By Mr. G. W. Wynn, the following Lepidoptera taken in Wyre Forest this year:—*Eupithecia venosata* (a new record), *Acronycta ligustri*, *Boarmia repandata* var. *conversaria*, *Phorodesma bajularia*, *Acronycta leporina*, *Orgyia gonostigma* (male), *Angerona prunaria* (a series), *Cymatophora or*, *Boarmia roboraria*, and *Hadena genistæ;* also *Triphæna fimbria*, bred, from Sutton Park, including one in which the band of the hind wings was decidedly grey in colour, not black; also *Tæniocampa populeti* from Rhayader, North Wales; and bred series of *Hadena glauca* from both Sutton and Cannock Chase, those from Sutton being darker than those from Cannock, contrary to experience of other species of Lepidoptera. By Mrs. Petley, a nice series of *Cucullia umbratica* from Wyre Forest. By Mr. R. G. B. Chase, a small collection of Lepidoptera made during a month spent at Tenby, including *Cleora lichenaria* and *Agrotis lucernea.* By Mr. P. W. Abbot, a series of *Thecla pruni* from near Peterborough, and *Papilio machaon* from Wrexham Broad, Norfolk. By Mr. J. T. Fountain, *Scotosia vetulata* from Salford Priors.

August 17*th*.—Mr. R. C. Bradley in the chair. Exhibits:—By Mr. Wainwright (for Mr. C. A. E. Rodgers), a specimen of *Smerinthus tiliæ*, from Malvern, which entirely lacked the reddish tinges of the wings, and was entirely green, rich and dark in colour. By Mr. R. C. Bradley, *Formica exsecta* from Bournemouth, the known British locality, one male taken on May 10th; also a specimen of *Ponera contracta* from his garden at Sutton, a rare ant which he said was not hitherto known in the Midlands. By Mr. R. G. B. Chase, *Vanessa c-album* and *Triphæna ianthina*, both from Edgbaston. By M. A. H. Martineau, a piece of a gate-post with nests of *Anthophora furcata* and *Pemphredon lugubris*, and explained the manner of making them, &c.—Colbran J. Wainwright, *Hon. Sec.*

Lancashire and Cheshire Entomological Society.—An Exhibition Meeting was held on Monday, Sept. 14th, under the presidency of Mr. S. J. Capper, F.L.S., and was decidedly successful, the number and variety of the exhibits being in excess of any previous meeting. Some of the more notable exhibits were as follows:—By the President, a drawer containing 300 varieties of *Arctia lubricipeda*, including vars. *eboraci* and *radiata* and many fine aberrations; and a similar drawer of *A. menthastri*, including a long series with brown upper wings. By Mr. B. H. Crabtree, a very long series of *Cœnonympha davus* var. *rothliebii*, from Witherslack; three very light *Argynnis euphrosyne*, and two dark *A. selene;* and a drawer of Sesiidæ, including rows of *Sesia sphegiformis*, *S. musciformis*, *S. ichneumoniformis*, *S. chrysidiformis*, and *S. scoliiformis*. By Mr. Harold Milne, long series of *Erebia blandina* and *Cloantha solidaginis*, an extreme form of *Lycæna ægon* var. *corsica*, a magnificent *C. davus* having the ocelli very large and elongated (similar to a variety of *E. hyperanthus* recently figured), a fine *Euthemonia russula* with immaculate hind wings, a melanic *Macaria liturata*, and a very large *Abraxas grossulariata* deeply suffused with yellow. By Mr. Joseph Collins, a collection of moss insects, including fine series of *Carsia imbutata*, *Hydrœcia petasitis*, and a melanic race of *Cymatophora duplaris*. By Mr. T. G. Mason, series of *Hydrœcia nictitans* var. *paludis*, *Orgyia fascelina*, and a black var. of *C. duplaris*. By Mr. R. Tait, imagines and living larvæ of *Agrotis ashworthii*, a splendid var. of *Asphalia ridens* having the base and apex broadly light and the central fascia very dark, and a *Noctua* which is probably a variety of *Agrotis agathina*. By Mr. Prince, series of *Bombyx trifolii*, and two *Leucoma salicis* which have the outer margins of the fore wings suffused with smoky black. By Mr. H. Bickerton-Jones, series of *Leucania littoralis* and *Orgyia fascelina*, including two asymmetrical females, both having black blotches on the costa of the left upper wing; and a box of Geometers, including *Psodos trepidaria*, *Hyria auroraria*, *Asthena blomeri*, *Lobophora viretata*, and *P. lapidata*. By Mr. F. N. Pierce, vars. of *Polyommatus phlœas*, and a curious malformation of *Strenia clathrata*. By Dr. J. Harold Bailey, a collection of Coleoptera from the banks of the Ribble, including *Bledius subterraneus* and *B. pallipes*, and *Telephorus paludosus*, which is new to Lancashire.—H. Bickerton-Jones, *Hon. Sec.*; 180, Lodge Lane.

The Nonpareil Entomological and Natural History Society.—*October* 1*st*, 1896.—Exhibits:—By Mr. Samson, very fine series of *Arge galatea*, caught on Andover Downs; also specimens of *Chærocampa elpenor* which were in faultless condition. By Mr. Martin, a nice specimen of *Acherontia atropos*, which he had bred from a larva found in the Isle of Wight. By Mr. Gurney, specimens of *Dianthœcia conspersa*, *Plusia chrysitis*, and *Cymatophora ridens*, the latter being of a very dark form. By Mr. Huckett, good series of *Polyommatus adonis*, both male and female, taken at Folkestone. By Mr. J. A. Clarke, who visited the Society towards the close of the evening, two specimens of *Nyssia lapponaria*, and three splendid varieties of *Abraxas grossulariata*, one showing the black mantle form, another being of the yellow mantle form, whilst the third was almost devoid of markings on the fore wings and quite so on the hind wings; also a very variable series of *Oporabia filigrammaria*. The result of the election of officers was as follows:—President, Mr. Thos. Jackson. Vice-President, Mr. Wm. Stevens. Curator, Mr. Harpur. Secretary, Mr. F. West. Treasurer, Mr. H. Blake. Reporting Secretary and Librarian, Mr. F. A. Newbery. Trustees, Mr. Gurney and Mr. Huckett. Committee, Messrs. Huckett, Gurney, Norman (E.), Cooper, Harpur (W.), Farmer, Butt, Lusby, Moore, Samson, and Norman (A.). Mr. Clarke was afterwards enrolled a member of the Society.—F. A. Newbery, *Reporting Secretary.*

RECENT LITERATURE.

'The Gypsy Moth (*Porthetria dispar*, Linn.): A Report of the Work of Destroying the Insect in the Commonwealth of Massachusetts; together with an Account of its History and Habits both in Massachusetts and Europe.' By Edward H. Forbush and Charles H. Fernald, A.M., Ph.D. 495 pp. Appendices and Index c; with 66 plates (some coloured), numerous illustrations in the text, and 5 maps. Published under the direction of the State Board of Agriculture by authority of the Legislature. Boston: Wright & Potter. 1896.

'Contributions towards a Monograph of the Aleurodidæ, a Family of Hemiptera-Homoptera.' By W. M. Maskell. 39 pp., 12 plates. Extract from 'Trans. New Zealand Institute,' vol. xxviii. 1896.

'Further Coccid Notes; with Descriptions of New Species, and Discussion of Questions of Interest.' By W. M. Marshall. 31 pp., 8 plates. Extract from 'Trans. New Zealand Institute,' vol. xxviii. 1896.

'Nineteenth Report of the State Entomologist on the Noxious and Beneficial Insects of the State of Illinois for the years 1893 and 1894.' By S. A. Forbes. 206 pp., 13 plates. Springfield, Ill.: Ed. F. Hartman, State Printer. 1896.

'On the Mediterranean Flour Moth (*Ephestia kuehniella*, Zell.).' Appendix to above. By W. G. Johnson.

'New Mallophaga: 1. With Special Reference to a Collection made from Maritime Birds of the Bay of Monterey, California.' By Vernon L. Kellogg. 168 pp., 14 plates. Leland Standford, Jun. University, Paulo Alto, California. 1896.

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ABERRATIONS OF *ZYGÆNA TRIFOLII.*

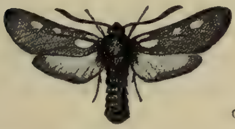

Fig. 1.

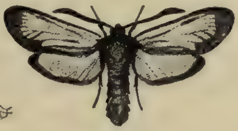

Fig. 2.

The two insects figured above were taken by myself in West Sussex.

Fig. 1.—This specimen of *Zygæna trifolii* has only four spots on each wing, and is the only example of this form of the species that I have ever seen.

Fig. 2 represents a variety of *Z. trifolii* which I have already referred to in this Journal as reminding me of *Z. pilosellæ* (Entom. xxviii. p. 215). Three examples, all pretty much of this form, were taken. I may add that *Z. meliloti* and *Z. loniceræ* also exhibit this *pilosellæ*-like form of aberration, as may be seen by referring to Mr. Barrett's book (vol. ii. pl. 59).

W. M. Christy.

November, 1896.

NOTES ON THE EARLIER STAGES OF THE SECOND BROOD OF *POLYOMMATUS* (*LYCÆNA*) *ARGIOLUS*.*

By Robert Adkin, F.E.S.

While staying at Eastbourne in August last I chanced to come upon a female *Polyommatus argiolus* in the act of depositing ova on heads of flower-buds of ivy; subsequent search revealed eggs in considerable numbers, and later on the resultant larvæ. I was thus enabled to follow the life-history of the autumn brood under absolutely natural conditions, from the laying of the egg till the pupal stage was reached, of which the following is a brief account:—

At the time when the butterflies of the second brood are on the wing, the flower-buds of the ivy are still young and form compact heads. The butterfly, having selected one of these heads, settles upon its top, closes her wings over her back, and, bending her abdomen down and round underneath the buds, affixes an egg to the under side of one of the slender single bud-stalks. In about a week the eggs hatch. The young larva, which in colour matches the buds very closely, rests on the bud-stalk with its anterior segments, which completely cover its head, pressed closely against the bud, and looks so exactly like a slight swelling of the upper part of the stalk as to make detection a matter of great difficulty, even with the aid of a fairly powerful lens. Throughout its life the larva is very sluggish in its habits, seldom leaving the head of buds on which it is hatched, so long as sufficient food remains for its nourishment, or occasionally when about to change its skin. It appears to feed only at night, and its manner of feeding, which is the same throughout its life, is to eat a round hole through the outer shell of a bud, and pressing its head forward through it to clear out the soft inside of the bud. In from four to six weeks it is full-fed; it then quits the buds, and attaches itself by slender silken threads to a leaf, and in a few days becomes a pupa, in which state it passes the winter. Although there is an amount of recorded evidence that the larva will take other foods, the peculiar resting habit and manner of attacking the flower-buds suggest very strongly that the only natural pabulum of the later brood is the ivy flower-buds, and the early brood would find the flower-buds and young green berries of the holly similarly suitable to their habits.

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* Abstract of a paper read before the South London Entomological and Natural History Society, Nov. 12th, 1896.

THE SENSES OF INSECTS.

By J. Arkle.

The criticisms from home and abroad, hostile and friendly, scientific and lay, which have been made upon my remarks under this head (Entom. xxvii. 336; xxviii. 243) have been a source of much personal gratification. The subject has even been reviewed by Mr. Tutt (Entom. Record, vii. 178). If this acknowledgment should appear to come somewhat tardily, I would say I have been waiting for additional light on the views and experience of some of my critics. Like Mr. Marshall's "anomaly," however, I have still to wait.

I am by no means the author of the objection to hearing in insects. Among scientific men, Linné and Bonnet thought insects had no hearing. It would scarcely be fair to retort that I seek cover under fossil authorities. For I have been rather surprised to find that some of the experiences quoted by present-day writers in support of hearing in insects are decidedly ancient rather than modern. The word "hearing" implies a sensitiveness to sounds in general. It is a human conception, and defines a sense common to man and other vertebrates. Whenever I look for evidence of this sense in insects, I look in vain. That is my position with reference to all insects I know.

Mr. Marshall observes (Entom. xxix. 42):—"I should consider that the difference between the sense of hearing and that of touch is only one of degree and not of kind." I cannot agree with him. I believe hearing and touch are distinct senses. We no more use the organs of touch for the purpose of hearing than we use for the purpose of touch the internal ear.

Let us travel a little with the theory of concussion or vibration as applied to insects—even though that theory, as yet, be but a parasite on what is admittedly an inexact science. It is something more than the concussion or vibration set up by a blow on a tree. Let us seek for something like a definition; see if there can be room for such a theory; leave it for the present as a thing we know little about; and seek consolation in the thought that if we knew everything we should think far too much of ourselves. By way of definition here is what Kirby and Spence say:—"The hearing in insects may be something related to hearing as *we* understand it. Antennæ, for example, may collect notices from the atmosphere, receive pulses or vibrations and communicate them to the sensorium, which, though not precisely to be called hearing, may answer the same purpose" ('Introduction to Entomology,' vol. iv. p. 240). And here is scope even from Mr. Marshall:—"There is little doubt that such auditory powers as are possessed by insects are of a very different character from those possessed by man, as they are not nearly so highly specialised or differentiated, and it is extremely probable that they are in many instances nearly allied to, or combined with, the faculties of touch."

To claim the sense of *hearing* for insects after admissions like these is indefensible. Let us look a little at the anatomy of an insect. It is enclosed in a kind of shell. We wear our skeleton internally; the insect wears its externally. Protection against injury is not the only thing aimed at under this arrangement. Take a living *Æschna grandis* by the wings and turn it upside down. You will see, with the aid of a lens, one of the most delicate mechanisms, suggesting respiration and circulation, close to the thorax, and exposed to injury every time the fly settles on a hedge. The dragonfly wears his shell dorsally and laterally—just where there seems least risk of injury. And here and there, as in other insects, this shell is studded with minute hairs, which may also "collect notices from the atmosphere, pulses and vibrations." To sum up: there may be a great deal in connection with this horny shell not dreamt of in our philosophy.

He who would wander in the paths of atrophy and development must start with a stock of faith. I do not point to this as a fault, but a fact. For humanity can hardly stir without faith. Leaving the era before the common cell of protoplasm as prehistoric, we arrive at a general, if momentary, agreement upon the chronological origin of insects and vertebrates. The insects came first. And so "our cerebral hemispheres are but modifications of the supra-œsophageal ganglia of a scorpion, while our eyes and nose are the direct descendants of its eyes and olfactory organs." True, this explanation "differs from all others," but that is as nothing—and it is present-day. But at this the layman definitely revolts. Neither will he have it that there is a "residual reptilian influence" in the practice of hissing bad plays; or that when we yawn "we are trying to use gills which have been closed nobody knows how long." He asserts, "If the unscientific person read much of this sort of thing without the proper correctives, and looked at the freaks and perversities of evolution without looking still more at its great sanities, he might believe that Nature made her arrangements chiefly for some time ago, and that her later children have to put up accordingly with a mortifyingly large proportion of second-hand and misfitting instincts." Personally, by preference, and without fear or favour, my faith lies in the story of Creation. Nothing there must be upset, save on the strictest lines of reciprocity. *Quid pro quo!*

To turn again upon the additional sense in insects is like slaying the slain. Mr. Marshall asks (*ante*, p. 48), "Many insects, such as bees, ants, &c., possess a definite and fixed abode, from which they are in the habit of wandering, sometimes for considerable distances, in search of food. Now, if these insects have no sense of direction whatever, how can they find their way back as accurately as they do?" They find their way by the use of landmarks! Disturb a bee, and it will circle round and round like a carrier-pigeon. Here is a hive only a few hundred yards from the sea. Twenty bees are liberated on the shore, and not one of them returns! Another lot set free on a lawn two hundred yards away—another unaccustomed place—are equally unable to find the hive! Forty ants feeding on some honey placed on a square of glass close to their nest are removed fifty yards off. They all lose themselves! Now, I pause to consider what would be the result were this a lay instead of a scientific explanation. One of my critics, I fear, would betake himself to the seat of the scornful; another to bone-picking—rest and refreshment? But the explanation is that of Sir John Lubbock, of Mr. Romanes, of Mons. Fabre. The experiments I very briefly quote will be found described at length, with others, in 'The Senses of Animals' (Sir J. Lubbock), chapter xiii.

Chester, November 2nd, 1896.

ON THE PREPONDERATING INFLUENCE OF THE ORGANIC OVER THE PHYSICAL ENVIRONMENT IN DETERMINING THE VERTICAL DISTRIBUTION OF THE LEPIDOPTERA.

By W. Harcourt-Bath.

In endeavouring to elucidate the various problems connected with the vertical distribution of the Lepidoptera in the different and diverse mountain systems in Europe, a great many factors have to be taken by the student into consideration.

The hypothesis of the glacial epoch and the subsequent amelioration of the climate supply us with the means of gauging the indirect action of the physical conditions which have operated to produce the present result. But a little further insight into the subject at the same time will enable us also to estimate and appreciate the preponderating influence exerted by the organic over the physical environment.

Although many hold that the mere effect of the climatal conditions (especially the temperature and precipitation) are by themselves the principal factors in deciding the vertical distribution of the great majority of species, I am perfectly convinced personally that such is not the case, but that they do in point of fact play quite a subordinate part in the determination, although they may be in a good many instances the indirect cause thereof.

Many examples could be given in support of this contention. I will confine myself to a few.

Numerous species of alpine plants which only live at great altitudes upon the mountains in their native habitat can be made without any difficulty whatever to flourish in gardens even down to the sea-level. Witness, for instance, the many kinds of alpine saxifrages and gentians, &c., which are in cultivation. The various species of pines and fir trees which constitute the typical arboreal conditions of the sub-alpine zone in the mountains, and of the sub-arctic region of the horizontal isotherms, can in like manner be successfully grown in places where the temperature is considerably higher. There is no reason therefore whatever to conclude that their distribution either vertically or horizontally is directly due to the climatal conditions.

The same thing precisely holds good with regard to the Lepidoptera, which are subject to the same general laws as the plants which provide their pabula.

There are, on the other hand, some powerful reasons for supposing that many of the species of plants and animals which are now confined to high altitudes upon the mountains, or exist only in the high latitudes of the north, owe their survival almost exclusively to the direct influence of the organic environment. The particular organic competition with which they would have to contend at lower elevations may be entirely wanting at the higher ones. In the case of insects, their natural enemies, birds, bats, moles, shrews, lizards, and frogs, are usually very scarce in all the higher zones.

In many parts of the Alps, where the mountaineers have ruthlessly destroyed many of the more extensive forests of deciduous trees, the conifers have taken their place, in some instances springing up spontaneously, and at present successfully maintaining their ground against the oaks and the beeches. The inference to be drawn from this fact is that the conifers are capable of flourishing at lower levels than they at present occupy, quite as well as at the higher ones, provided they are precluded the possibility of competition from the more vigorous oaks and beeches of the lower elevations. Whether the pines and the firs will successfully prevent the encroachment of the latter in the spaces which have been cleared for them, for several centuries to come, is, I should venture to say, extremely doubtful. On the other hand, the conifers, with their needle-like foliage presenting a minimum of surface to the frost, alone survive at the higher altitudes where the deciduous trees would, by reason of their larger leaves, soon perish.

The direct influence of the climatal conditions seems to act more powerfully in curtailing the upper rather than the lower limits of species. Many species of butterflies and moths thus seem very sensitive to cold, especially in the pupa-state, as is well known to those who rear exotic forms in this country. This is possibly the principal reason why *Acherontia atropos* and several other species of Sphingidæ do not occur permanently more plentifully in the British Isles than is the case, although certain plants which the larvæ are known to feed upon are found in sufficient abundance.

Deficiency of moisture seems in a similar way to circumscribe the distribution of certain species in other countries. These are also apparently instances of the direct influence of the physical conditions.

The distribution of the Lepidoptera both vertically and horizontally is not by any means always co-extensive with that of their pabula. In some instances it may be more extensive than that of their usual food-plant, when they select a closely-allied species in its stead; but in the majority of cases the plant possesses the widest distribution of the two. In the latter the struggle for existence with their natural enemies proves too great for the insects, notwithstanding the abundance of their food supply.

We have good grounds for supposing that many species of animals and plants formerly existed in situations and at elevations where the climatal conditions were very different from those which they occupy at the present day. There are numerous examples of this to be found in the Alps, the correct causes of which we know. The chamois, for instance, which formerly frequented the pine forests, are now seldom seen there, except in the winter time, having been forced to flee upwards before their chief enemy, man. The bear, the lynx, and the ibex have similarly had to seek refuge among the higher and more inaccessible peaks. Many insects are also now found less commonly than formerly at the lower elevations, owing to the extension of cultivation. Numerous other similar instances might be adduced all in support of the superior power of the organic environment.

From the discontinuity in the present distribution of many genera and species of fauna and flora, their former more extensive area which they occupied may be estimated. Take, for instance, the Pyrenean desman or water mole (*Mygale pyrenaica*), which possesses its nearest relative in the steppes of South Russia. Then we have two species of butterflies in Europe, namely, *Zegris eupheme*, which occurs in Andalusia, South Russia, and Asia Minor; and also *Satyrus hippolyte*, which is likewise found in the Iberian Peninsula, and again in the South of Russia, but not in any intermediate locality. All of these must once have possessed a continuous distribution in order to account for their present dispersion.

The genus *Œnis*, or its immediate stirps, undoubtedly possessed in former times an almost complete cosmopolite distribution both geographically and vertically, if we thus can correctly interpret the fact that the most closely allied representatives of this arctic and alpine group are elsewhere (in the southern hemisphere) to be found in the alps of New Zealand (*Argyrophenga*), and in the Chilian Andes (*Argyrop*); while the well-known genus *Erebia* was once in an almost similar position, judging from the fact that it possesses very near representatives in the Southern Andes of South America, as well as in the highlands of South Africa, several genera of which were indeed formerly included in that of *Erebia*. If, however, in the latter case the genus may not have been so completely cosmopolite, I do not see that the contention cannot hold good with regard to the former; for if, as Darwin suggested, the alpine fauna of the American Andes was derived from the regions to the north during the glacial epoch by means of the elevated mountain chain crossing the equator, I fail to perceive how it can account for the occurrence in a similar manner, in the isolated archipelago of New Zealand, of the genus *Argyrophenga*, which is so closely allied to *Œnis* of our northern hemisphere. In this connection, I may here remark that the marsupial mammals which are now so abundant and characteristic of the Antipodes were, during Miocene times, almost equally as plentiful in Europe, including the British Isles.

Another important item in support of the hypothesis that the organic conditions exert a paramount influence upon their distribution is to be found in the fact that many species of plants and animals occur in certain zones upon some mountains which do not correspond with their occurrence in other zones further north. A typical instance of this is to be found in the Austral species *Lampides bœtica*, which in the region of the Alps only inhabits the lower valleys of the mountains, but which, both in the Pyrenees and the Himalayas, occurs at greater elevations both comparatively and relatively, having been found in the former range at the altitude of 8000 ft. under circumstances which conclusively prove that it could not have been a mere immigrant there. Conversely, a few instances could be given to show that certain species do not occur at such corresponding high zones as is the case further north. In certain instances also, species are known to be confined to intermediate zones in comparison to those they occupy in other mountain chains, or even in different parts of the same range. The general rule is, however, the other way, and their vertical distribution corresponds with remarkable uniformity in relation to both the accompanying phyto-geographical and the climatological conditions of regions and mountain ranges widely separated.

This remarkable regularity, however, does not at all detract from the hypothesis that it is the organic environment which carries the greatest weight, for when brought into competition with the physical the latter has simply to succumb to it. It is only when the former influence is exerted in a negative manner that the effects arising from the physical conditions can survive. We have thus sound reasons for supposing that the insects are confined to particular zones principally by means of the organic barriers which prevail upon either side of them.

It may be true to a considerable extent that the physical conditions operating upon the organism during the course of many generations do produce effects and modify peculiarities favourable to their survival, but only through natural selection, for if these climatic modifications possessed traits or developed correlative characters which were antagonistic to their well-being, they could not possibly retain their place successfully in the great struggle for existence.

Birmingham, Oct. 20th, 1896.

THE ABERRATIONS OF SECONDARY SEXUAL CHARACTERS IN PAPILIONIDÆ.

By John Watson.

In the 'Entomologist,' vol. xxviii. p. 166 (1895), I drew attention to two aberrations of secondary sexual characters in male Rhopalocera, one being an androconia-bearing male of *Papilio paris*, L.; the other being a male of *Eriocolias fieldii*, Mén., without the characteristic congested scale-patch on hind wings.

A few weeks since, in going over the fine collection of my friend Mr. Paul Schill, I came across another male of *P. paris*, identical in all respects to mine; and later on again, in a small collection I received from Shillong, in Assam, I found another male with this character faintly showing, but at the same time quite appreciable on examination with a lens, and thus being intermediate between typical *P. paris* and the androconius aberration. This brings forcibly to my mind the need for fixing an identity to these phylogenetically valuable evidences of generic and specific affinity.

In regard to *P. paris*, on microscopical examination of a small portion of scales taken from the androconius nervule, it is clearly seen how the long filamentous scales have been derived from the ordinary dark brown dentate ones; for I have on one slide scales showing the whole range of variation from normal scale to androconia. The plan of the development from the ordinary squamose quadridentate scale appears to be this:—Coincidental to the lengthening of the scale, usually (though not always) the two centre teeth merge into one; in scales which have a length of six to eight times as long as broad the two lateral points have disappeared, leaving a long scale thicker at two-thirds than one-third from the base; sometimes the two lateral teeth disappear the first, and leave a bilobed scale, which persists as such up to scales having a length of about ten times as long as broad, when the two lobes merge; the pedicular point of attachment becoming later on merged into the lengthened scale, so that the demarcation of scale and pedicle is not apparent; the whole then becomes a long brittle filament, with a slightly punctured surface, and ending in an almost imperceptible point,—typical androconia. One point in regard to these androconia of *P. paris* is, that apparently they are nearer in structure as to build and stoutness to *P. bianor*, Cram., than to *P. ganesa*, Doubl., which latter species it most nearly resembles in outward appearance.

I sent the type-specimen for examination to the Hon. Walter Rothschild, who considers it interesting as showing that too much faith must not be placed upon the presence or absence of the secondary sexual characters for defining genera, and with which I now agree; for (1st) while an individual of a species may occur as an aberration possessing a character, sexual or otherwise, which is not found in its genus, and the genus would still be held as a good one; yet (2nd) if two or more individuals of a certain species of a genus, occurring as aberrations and possessing a character showing transitions from the type of their genus towards the type of an allied genus; or again (3rd) a specimen of a genus I will term A occurring as an aberration possesses a character well developed, found normally in an allied genus B, and an individual of genus B, also found as an aberration, does not have this distinctive character of its genus; it follows that though the occurrence of the first type of aberration which I designate "adventitious" would not affect the stability of the genus to which it belonged, the occurrence of cases of either the second type (transitional) or the third type (overlapping) would certainly merge together the two genera in which these types of aberration appeared, though it would be advisable, I think, to retain the newer genus as a subgenus if possible.

In his 'Revision of Papilios of the Eastern Hemisphere exclusive of Africa,' Mr. Rothschild, speaking of *Papilio bianor*, Cram., p. 379, says:—"I have specimens in which all the stripes are separated from one another; and such a variability is not to be wondered at, as we find the cottony stripes variable in size and number in all the species where they appear; in some insects, for example in *P. crino*, Fab., and *P. montrouzieri*, Bois., these sexual marks vary even to such an extent that certain individuals have the stripes developed, while others have no stripes at all"; and I now find this certainly is the case with *P. paris;* thus his group xxiii. (*bianor* group) will, if no other character is found sufficient to separate them, be merged along with group xxiv. (*paris* group), being connected by the aberration I am about to describe.

Papilio paris, L., male ab. *schilli.*—Male. With a streak of filamentous scales on the first median nervule of upper surface of fore wings. Hab. Assam. Two specimens. In my own and the collection of Mr. Paul Schill.

Transitional form to the ab. *schilli.*—With the cottony streak very faint. Hab. Shillong, Assam. One specimen. In coll. Watson.

It is by no means unlikely that the ab. *schilli* is to be found in other collections, where it has been unnoticed; and here is my contention, that by not having this aberration distinguished a most interesting point may be kept in the background. I am by no means one who favours the wholesale creation of species, and on characters which will often not bear investigation, as is often done, particularly on the Continent, and from a pecuniary point; but there are two ends to every stick, and I think the most consistent plan is to pursue the medium line of moderation, and the most thorough exposition of this middle course is to be found in the plan of classification laid down and followed by the Hon. Walter Rothschild in his 'Revision of Papilios' (*loc. cit.*), which, in reducing a host of so-called species to the rank of subspecies (vars.), is the most drastic of which I know, and is at the same time the most detailed in the classification of every known form, variety, or aberration, according to its form, season, locality, &c.

The genus *Eriocolias* (Watson, Entom. xxviii. 166) will now take rank as a subgenus, as I believe the aberrations of *E. fieldii* and *Colias erate* I am about to describe will bridge over and connect the two sections.

Colias (subgenus *Eriocolias*) *fieldii*, Mén., male ab. *moorei.* Male. Without the congested scale-patch on costa of upper surface of hind wings as normally found in individuals of this species. Hab. N.W. Himalaya. One specimen. In coll. Watson.

I have named this aberration after Mr. Frederick Moore. I have examined the twenty-eight males of *E. fieldii* in my collection, and there is no variation in the size of the scale-spot, except one example, other than a proportionate size to the insect; the one exception is not less than two-thirds average size, and I have seen and examined at least a hundred and fifty other specimens.

The entire opposite to this type of aberration is:—

Colias erate, Esp., male ab. *erioptera.* Male. With a congested scale-patch as normally found on costa of specimens of subgenus

Eriocolias. Two specimens. In collections of Mr. F. Moore and my own. Mr. Moore's specimen from Punkabaree, 1500 ft., Eastern Himalayas; my specimen from Corea.

This ab. of *C. erate* and the one of *E. fieldii* together form an instance of the third type of aberration or *overlapping;* the male ab. *schilli* of *P. paris* is a case of the second or *transitional;* and as an instance of the first or *adventitious* aberration (which is not, however, referable to secondary sexual character), I may mention the type-specimen of *Calinaga sudassana* (Melv. Trans. Ent. Soc. 1893, pl. 8). On closely examining the lozenge- or spindle-shaped spot (beautifully shown on the plate) on the costal nervure of hind wings, and which only the type-specimen shows, it is seen to be a split in the nervure at a certain point, on both hind wings and at the same place, where the nervure forks, and, having diverged about one-fourth of an inch, the two separate limbs approach, anastomose, and continue as the costal nervure. It is here interesting to note that a male of *C. buddha* in my collection has, at about the same position on the costal nervure of hind wings, on one side only however, a small short spur or veinlet given off from the costal to the costal edge of the wing. Mr. Hastings Dent's specimen of *C. sudassana* does not show the split, nor does the third specimen of this species in the Hon. Walter Rothschild's collection. This aberration of *sudassana* may be classed along with monstrous aberrations, but it *may*, along with the male of *C. buddha* mentioned, have a morphological significance as yet not understood.

SILK-PRODUCING LEPIDOPTERA.

By Alfred Wailly.

(Continued from p. 279.)

African Species.

The African silk-producing Bombyces, excepting a few, are yet unknown as silk-producers; I can therefore only give the names of some species:—In Sierra Leone, *Saturnia alenda* and *S. phædusa*, Drury. In Natal, *Actias mimosæ*. In Senegal there is a species with a closed cocoon, *Attacus faidherbia*, which must then be an *Antheræa*, and it may be the species otherwise known as *Bombyx bauhiniæ*.

The wild silkworms of Madagascar are better known, thanks to the Rev. P. Camboué, who has written numerous and interesting reports on this subject, which have been published in the 'Bulletin' of the Société Nationale d'Acclimatation de France. I shall therefore reproduce an article from the 'Bulletin' of June, 1885, by the Rev. P. Camboué.

BOROCERA MADAGASCARIENSIS, Boisduval. A species which the Malgaches call Bibindandy, which means silkworm, from which they obtain silk used in the manufacture of their magnificent stuffs called Lamba-landy. The cocoon, of a greyish colour, is about 0·05 m. in length by 0·03 m. in its broadest diameter, when produced by the female insect. The cocoon of the male is but 0·03 m. in length by 0·015 m. in its largest diameter. The moths emerge about thirty days after the formation of the chrysalis. The Bibindandy larva is very polyphagous, but the Malgaches rear it in preference on the *Cytisus cajanus* and on the *Tapia edulis;* among other trees the weeping willow is given. The Rev. P. Camboué also says he found on the coast cocoons of Bibindandy on the orange tree, on a species of *Terminalia* called in French "*Badamier,*" and on the *Baringtonia speciosa.* On the western coast many are found on the "palétuviers" or mangrove, and other trees growing on the sea-shore. The Bibindandy can live on the hills in the interior of the island, where there are only three or four degrees centigrade of heat. This is the most important of the wild silkworms of Madagascar.

BIBINDANDY DYNAMBOA (dog silkworm) and BIBINDANDY MADINIKA (small silkworm) are two species of *Borocera* allied to *B. madagascariensis.*

GONOMETA POSTICA, Walker. An important South African species, which feeds on *Mimosa caffia.* The female cocoon is considerably larger than that of the male, and the insect has a striking analogy with the *Borocera.* It is described and figured in the report for the years 1887 and 1888, presented to the Lyons Chamber of Commerce by the "Commission administrative," Mr. Roberts, of Uitenhage, having sent, through the medium of the Vice-Consul of France at Port Elizabeth, for the laboratory of the Lyons Chamber of Commerce, specimens of cocoons and moths, and all useful information respecting this species. According to the notes of Mr. Roberts, the moths of *G. postica* emerge in September, and the larvæ arrive at maturity about the end of December and commencement of January, and then form their cocoons, the pupæ remaining eight months in the cocoons before the moths emerge. During this long interval most of the pupæ are destroyed by a dipterous parasite, hardly a fifth of the live cocoons remaining for the reproduction of the species. Fortunately another parasite, one of the Hymenoptera, feeds in its turn on the terrible Dipteron, and thus limits its multiplication.

SATURNIA SURUKA, Boisduval, *Caligula suruka.* A large and beautiful species. The larva attains a length of ten centimeters, and forms a double net-work cocoon of a yellowish tint, about six centimeters in length, and three centimeters in its widest diameter. The larva, which is polyphagous, lives well on *Nerium oleander.* When full grown it is green, with greenish-black spots, and thorny tubercles of a rosy tint. The perfect insect emerges about thirty days after the formation of the cocoon.

The Rev. P. Camboué has observed on the eastern coast, at Tamatave, another species of *Saturnia*, allied, to a certain extent, to *S. suruka*. The larva, a false Geometer, is beautifully black, ornamented on its segments with thorny projections, yellow on the last eight segments and pink on the first. The body is covered with spots of the same colour as the tubercles. The spiracles are black bordered with yellow; the claspers of a fine, shining black. It reaches nine centimeters in length, and is twelve millimeters in its widest diameter. It is polyphagous, and lives well on oleander. The cocoon is smaller and of a darker colour than that of *S. suruka*.

There are in South Africa several species of large Bombycidæ, six of which bear the following names:—*Antheræa menippe*, *A. tyrrhea*, *A. cytheræa* (*dione*), *Gynanisa isis*, *Bunæa caffraria*, and *Cirina forda*. The appearance of the moths of these species would certainly lead any entomologist, unacquainted with the first stages of the insects, to think that the first three, bearing the generic name of *Antheræa*, form closed cocoons like the other known species of *Antheræa*, and also that *Gynanisa* or *Saturnia isis* forms an open cocoon like *Saturnia pyri* or some other *Saturnia* or *Attacus*, but it is nothing of the sort. The larvæ of these species, and also that of *Bunæa caffraria*, burrow into the ground without forming any cocoon or shell of any sort. Another peculiarity is that the bare pupæ of these species resemble each other so much that it is difficult to distinguish them from one another. These five species have been bred during several years by two of my correspondents, and I have received pupæ of them from 1886 up to the present year. These pupæ are several months before producing the perfect insect, and they can easily pass the tropics without hatching during the voyage. I have now learnt by experience that, as a rule, pupæ of *Bombycidæ* from temperate climates can make long voyages without hatching, even under the influence of intense tropical heats; whilst tropical species often hatch two or three weeks after they have left their native countries, even if the heat becomes much less intense. In general, most species seem to have a tendency to hatch at the time fixed by nature in their native country, unless the temperature should be too cold.

In the spring of the year 1886 I received mixed chrysalids of *G. isis*, *A. tyrrhea*, and *B. caffraria*, and the moths emerged as follows:—On July 1st, one male *isis;* August 23rd, one male and one female *isis;* September 3rd, one male *tyrrhea;* 12th, one male and two females; and on the 15th, one male. A pairing took place during the night of Sept. 14th and 15th. Up to Sept. 27th thirty moths had emerged. Next a *caffraria* moth emerged on Sept. 29th, and three *tyrrhea* from the 1st to 3rd of October; afterwards a male on the 5th, and another on the 19th of the same month, and that was the last. The eggs obtained from the pairing of Sept. 14th and 15th began to hatch on Nov. 3rd, and as a matter of course their existence was of very short duration.

BOMBYX CYTHERŒA (DIONE). On May 8th, 1888, I received a few small branches of a shrub with thick leaves, growing in the environs of Grahamstown, Cape Colony. On these leaves were fixed large white and reddish brown eggs. They were *cytherœa* eggs, and their number was ninety-seven. Sent from Grahamstown on April 16th, they reached me after a voyage of twenty-two days only. The hatching of fifty-seven larvæ took place on the day the box arrived (which was May 8th) and on the following day. The forty remaining ova, which were fixed to the same leaf, all hatched on the morning of May 18th.

The names of the food-plants for this species, which were sent by my correspondent, were white heath, *Acacia mimosa*, and wild currant, plants which I could not get. In a letter received much later on, I was informed that the larvæ could also be reared on willow. I offered them birch, oak, and plum, which they tried to eat, but every day I had to register some deaths. Whether the larva of this species be naturally slow in its development or the food did not suit it, the second stage commenced only on June 5th, eighteen days after the hatching, and the third stage on June 26th. The larvæ kept on dying every day till the end of July, when only three were left, and the last one died in August. This was a great disappointment, for the larvæ (which live in families) were large and very lively, and they had eaten the greater part of the shell of the egg before making their exit out of it. In the first stage the smaller larvæ are red, the head is large, shining, and black; the legs also are black. The larger ones (in all probability, those which are to produce the female moths) have a black ring round each segment; this ring is formed by a number of small black tubercles nearly touching one another. This ring of small tubercles was the only difference I observed; otherwise they were like the smaller larvæ. In the second stage the larvæ are of a fawn colour, with black tubercles covered with white thin hairs; the base of the tubercles is yellowish white, and the head black.

The following is a list of African Bombyces, including three already mentioned:—

BOMBYX BAUHINIÆ. Very much recommended as a silk producer.

BOMBYX ANNULIPES, Boisduval.

SATURNIA CAJINI, Guérin-Méneville.

BOMBYX RADAMA, Boisduval. A species common in Madagascar. The larvæ live in families, and form large bags or nests containing several hundred cocoons, the silk of which is utilised.

Bombyx diego. A species not so well known as the preceding one, but living in the same manner.

Bombyx fleuriotii, Guérin-Méneville. Little known; is used in the manufacture of the Lambas on the southern coast of Madagascar.

Saturnia auricolor, Mabille.

Saturnia fuscicolor, Mabille.

Bombyx panda. Lives like *radama*, and produces a highly valued silk.

Saturnia vacuna, Westwood. Lives in Ashantee.

Saturnia mythimnia, Westwood. Port Natal.

Saturnia belina, Westwood. Zululand.

Saturnia hersilia, Westwood. Congo.

Saturnia menippe, Westwood. Natal and other parts of South Africa.

Saturnia tyrrhea, Cramer. Cape of Good Hope and other parts of South Africa.

Saturnia nenia, Westwood. Congo.

Saturnia agathylla, Westwood.

Saturnia said, Oberthür. Fine and large species, found by M. Raffray at Bagamoyo, opposite the Island of Zanzibar.

Saturnia thyella zamberia, Felder.

(To be continued.)

NOTES AND OBSERVATIONS.

Re-appearance of Aporia cratægi.—Mr. Douglas Stockwell deserves the thanks of all lovers of butterflies, and of all true entomologists, for refraining from the publication of a more precise locality than the county in which *Aporia cratægi* has been captured this year (*ante*, p. 332). The county is enough for scientific purposes; and doubtless Mr. Stockwell can, if challenged by entomological authority, give any particulars required in the way of evidence, and in such a manner as would baffle the dealer and omnivorous collector. It is fortunate that Mr. Stockwell has followed the example of the editor of the 'Field' rather than that of Mr. Frohawk (*vide* Entom. xxv. 217).—Harold Hodge; 6, Crown Office Row, Temple, Oct. 11th, 1896.

The Geographical Varieties of Parnassius apollo.—I sincerely hope that numerous British entomologists who appear to be paying increased attention to European butterflies will not adopt Mr. Harcourt-Bath's suggestion that varietal names should be given to every form of *Parnassius apollo* which he or others think they can separate. We have already a great deal too many named varieties of European butterflies, many of which can only be distinguished when what some

German dealers call typical examples are picked out. I have fifty-three specimens from various parts of Europe and Asia, not enough to illustrate the species; but if you begin to name every form which shows a little difference, you may just as well make ten as three varieties. This will apply to many other species, and my experience goes to prove that a number of the forms named in Staudinger's last catalogue will eventually have to be struck out when we know more about them.—H. J. Elwes; Colesborne.

Vanessa antiopa.—Mr. Kirby's note on this species might lead persons who have not access to a large collection to suppose that there were races or constant local forms of this species distinguished by the colour of the margin. An examination of the twenty-two specimens (selected from much larger numbers) in my collection does not bear out this idea. Of European specimens I have only six—two from Stettin, two from Constantinople, two from the Alps—all of which have pale straw-coloured borders. Next I have ten North American specimens from such widely separated States as Washington, Colorado, North Carolina, and New York, as well as from Lower Canada, Lake Superior, and British Columbia. These are not on the average larger, as Mr. Kirby says, but their border is (except in the Lake Superior example) rather darker, and much more freckled with black specks. Then I have five—a fair sample of perhaps fifty—taken by my native collectors either in the Chumbi valley of Tibet, or the high valleys of Bhutan which adjoin it. This is the only locality from which any specimens have been procured by Indian collectors, and, as far as I know, the insect does not occur in Kashmir, Ladak, or the N.W. Himalaya. These specimens have borders, not white, as Mr. Kirby says the Bhutan ones in the Museum have, but dull yellowish, much freckled with black specks, and could not be distinguished from the N. American ones. Lastly, I have a Japanese specimen, whose border is intermediate in colour and freckling between the European and American or Himalayan examples. Though the tendency to vary is usually greatest in species which have a very wide distribution, yet this seems not to be the case in *antiopa:* and I can hardly believe that in England alone a variation which may occur anywhere has become fixed, especially as many English specimens are old, worn, and faded, and some of doubtful origin. Mr. Kirby's suggestion that the white-bordered variety is more or less a mountain insect seems to me to rest on very slight evidence.—H. J. Elwes; Colesborne, Nov. 1st.

Vanessa c-album, var. hutchinsonii.—I see that a slight controversy has arisen as to the varietal name of the brightly-coloured summer variety of *Vanessa c-album.* Formerly the existence of this form was here denied, but by the unremitting energy and care of Mrs. Hutchinson it was some years ago well established. At the same time Mrs. Hutchinson, with her invariable liberality, supplied our collections with this beautiful insect, furnished larvæ and pupæ for figuring, and exerted herself in all ways to make its history thoroughly known. One suitable, though very small, acknowledgment was made of this when the pretty summer form was named in her honour. So comparatively short is the period since passed, that it seems strange to see Mr. Harcourt-Bath's assertion (*ante*, p. 257) that "no name appears to have been given to this very distinctive seasonally dimorphic form." Perhaps it is fortunate—since the name proposed by him, *lutescens*, is not very suitable to an insect which is *not* yellow—that the prior name *hutchinsonii*, given by Mr. Robson, exists. That no doubt may remain in any one's mind, I venture to furnish extracts which will show, not only that the name was given, but also that it is known and used. Forty years ago I used to take *V. c-album* in Shropshire, as I since know, in two broods; it is interesting to know, from Mr. Harcourt-Bath's statement, that it is still there.—Chas. G. Barrett.

"*Vanessa c-album.*—The summer form is so different and so constant in its appearance that it ought to have a distinctive name, and we suggest that it be called *hutchinsonii*, in compliment to that lady whose liberality has enriched so many cabinets with specimens, whose knowledge of the species is not exceeded by that of any one living, and to whom we are greatly indebted for information mentioned above, and for the larva and pupa figured.—J. E. Robson."—'*Young Naturalist*,' vol. ii. p. 110.

"*Vanessa c-album.*—Common, some years especially so, *e.g.* 1887. The var. *hutchinsonii* (spring brood) may be obtained.—E. W. Bowell; Hereford."—'*Entomologist's Record*,' vol. ii. p. 136.

Mr. Harcourt-Bath is quite mistaken when he states (*ante*, p. 257) that he was the first to discover that the pale form of this species "only occurs as an aberration of the first generation in the season in this country." I pointed this out to Mr. Doubleday many years ago, and to many other entomologists since. I should be thankful to anyone who remembers my doing so, if they would corroborate my statement. Mr. Harcourt-Bath politely calls on me to state "where a definition under the cognomen" (of *hutchinsonii*) "was published." I am obliged to him for doing so, as it enables me to correct an error in the 'Entomologist' for last month, where, trusting to memory, I stated that Mr. Doubleday named the spring form after me. On going to look, I find it was Mr. Robson, of Hartlepool, who did so, as any entomologist can satisfy himself, by referring to 'The Young Naturalist' for Feb. 15th, 1881, or by consulting 'A List of British Lepidoptera and their Named Varieties.' All my rearing is carried on in a room without any fire, with windows to the north and east.—E. S. Hutchinson.

[Some interesting remarks by Mr. Frohawk, on the pale form of *Vanessa c-album*, will be found Entom. xxvii. pp. 288, 289.—Ed.]

On Preserving Spiders. — It sometimes surprises me that the study of spiders does not occupy more of the time and attention of naturalists, although I account for this partly by the difficulty of preserving the specimens; bottled spiders are not attractive. Of late I believe the study has gained more adherents, and the result of a few experiments I have made in preserving them may be useful. It is desirable that spiders should be attached to and set, like Coleoptera, on cards, but hitherto this has not been practicable, owing to their tendency to rot or shrivel. To obviate these defects I have tried preparing them by the same process microscopists have of hardening animal tissues, and have met with some success. First I keep them a day or two in Ranvier's alcohol, and then in one of the bichromate of potash liquids; then wash in water, and finally dehydrate in absolute alcohol; they are then fit for setting. Some I did last spring are unchanged, and even the abdomen is not contracted. I think that when naturalists know they can be so preserved as to be readily compared and look presentable in a cabinet, they may take to them.—B. Piffard.

Uniformity in Setting Lepidoptera.—Mr. Walter Dannatt's remarks (*ante*, p. 330) express exactly my own views on the subject. I quite fail to see any necessity for flat-setting high or otherwise. The main argument adduced in its favour is that insects so set are more readily and easily examined, but surely this is a very slight one, and quite inadequate to compensate for the great loss in appearance which such specimens sustain; for I quite agree with Mr. Dannatt that flat-set insects look unnatural and painfully artificial. It seems to me that we collectors of British Lepidoptera are desired to set our specimens flat simply for the benefit or convenience of those who go in for foreign insects as well, and we are accused of having "insular prejudices" and the like because we do not at once adopt the style. There is no prejudice at all in the matter that I can see. It is not given to everyone to have the means, the time, or the desire to do more than collect the British species; and, such being the case, they who have thus to confine their energies simply prefer to retain the curved mode of setting; but they find no fault with those who collect foreign insects as well, and who do not see as they do. Uniformity in height on the pin is certainly desirable, but this can be arrived at equally well with curved as with flat-setting. The former is the hall-mark, so to speak, of a British insect, and I trust will so remain.—E. Sabine; Erith.

High-flat Setting of Lepidoptera. — Mr. Walter Dannatt's remark on this subject (*ante*, p. 330) seems to me to be one-sided and prejudiced; so much has lately been said on the subject that I cannot understand where the objection to high-flat setting, which is now adopted everywhere, except in this country, comes in. And even in London the British Museum is resetting its specimens, if I am rightly informed. If, as Mr. Dannatt says, high-set specimens are classed at once as "continental," what prevents a dealer, or anyone, to reset his specimens and give them out as English, if he feels so inclined? the setting *alone* is no guarantee. Then, as to the exploded idea of looking "natural"; this seems to me to be still more absurd. If we talk of natural, we must not put the insect on a pin, and whether the wings are drooping or not, neither is natural—if this word must be used—since moths are not found in such positions as are shown in cabinets, whether they are high- or low-set. How often has the objection been pointed out to the English way of setting, in giving mites a beautiful chance of attacking the insects which all touch the bottom of the drawers, the small pins which nobody can get hold of properly, and other disadvantages; and if anyone will look at a drawer of Lepidoptera, as shown by Mr. Elwes and others at the Entomological

Society, set in the continental fashion, I think he must have a peculiar taste if he prefers the old style to the new. To speak of "laws of nature," when setting is concerned, seems to me to be entirely out of place.—M. Jacoby; Hemstall Road, W. Hampstead.

"Apple trees and Wingless Females."—I think that few practical entomologists will agree that Mr. Arkle has made out his case, *viz.* that the males *do* carry up the wingless females, and thus evade the grease-ring (*ante*, p. 193). I was not specially referring, in my previous remarks, to fruit trees, but to forest trees generally. If the males do carry the females, it must be either by accident or design. I do not say that it is impossible, but that it is highly improbable. *Cheimatobia brumata* is, I believe, one of the most destructive insects that the fruit-grower has to contend with, and the male of this species is a particularly weak flyer, and very unlikely to accomplish the feat. As far as design is concerned, I am not prepared to admit that any species could develop this tendency since grease-bands or any other preventive methods were invented. The arrangements adopted are most likely not sufficiently efficacious to ensure the capture of all the females as they ascend the trunks. There is also another matter to consider, —the distribution of these larvæ (and those of the genus *Hybernia*) by wind. Mr. Arkle admits that some fruit-growers say that the grease-rings are useless, and in that case they probably do not adopt them. Owing to their common habit of suspending themselves, a strong wind would easily account for the presence of larvæ in a neighbouring orchard. Last spring Hawk Wood, Chingford, presented a most remarkable spectacle. The larger trees—oaks, hornbeams, &c.—were enveloped as it were by huge cobwebs, and the long strands of twisted threads were floating in the wind to a considerable distance. Upon these silken ladders multitudes of larvæ (mostly those of wingless females) were ascending and descending. Finally, I do not think that it would be wise to assume that the males carry up the wingless females until we have further proof, as entomologists generally have very little faith in newspaper entomology, owing to the many misleading statements that have from time to time been published in the daily press.—Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W., Aug. 20th, 1896.

The Front Legs of Agriopis aprilina.—I bred a few specimens of *Agriopis aprilina* last autumn, and overcame the difficulty of getting out their front legs by letting them remain in the cyanide bottle about thirty-six hours. By this means the whole insect becomes much softer, and the legs come out as easy as those of any other moth.—F. Milton; 7, Chilton Street, Bethnal Green, E.

Entomologist *v.* Collector.—It has struck me, while reading the remarks on the above subject of various contributors to the 'Entomologist,' that the exact position of neither class has been at all clearly defined. I will endeavour to do so on purely theoretical grounds, and then perhaps it will appear that the problem can be reduced to comparative insignificance. As the terms stand, the only possible difference that suggests itself between the two classes exists in the supposition that while a "mere collector" does not set about his work with intelligence, the entomologist is essentially scientific. When the "mere collector" begins to set about his work with intelligence he ceases to own the name, and becomes an entomologist, as full-fledged and as essentially scientific as the propounder of natural laws and the theorist. The individual (and this an instance of a mere collector) who designedly picks up shells on a sea-shore with no other purpose than to consign to a smaller area objects that have been diffused over a greater is looked upon by me, and, I will venture to say, the rest of humanity, including Mr. Claxton, as not only far from being a conchologist, but as little short of a monomaniac. And yet, despite the fact that Mr. Claxton and the class he represents stigmatise themselves with the incriminating appellation of "mere collectors," we find they venture to defend themselves on the ground that they are seeking to acquire a full appreciation of the beauties of nature. In other words, Mr. Claxton and his colleagues, instead of striving to elucidate the scientific problem of enjoying the natural beauty of the earth (which by the way is the ultimate scientific problem) through the medium of natural laws, have attacked the subject in a wider and more direct field. On the other side of the question, to accuse real scientific men of trying to think away the beauties of the objects they investigate, is a mistake that belongs to an old and uneducated school. I think it probable, however, that Mr. Claxton has excellent cause for appealing against the attacks of those that have necessarily sprung into existence, like the tares with the wheat, together with the "new order" that has been destined to replace "the old."—G. W. Smith; College, Winchester.

I should like to be allowed to make a few suggestions on the subject brought forward by Rev. W. Claxton (*ante*, p. 286). He there defines collectors as "those whose only object is to obtain a more intimate knowledge of the external appearance of the wonders of creation." Now, omitting the words "external appearance of" and using "creation" in a somewhat metaphorical sense, this appears to me to be an accurate statement of the aim of every scientific worker: for, as Huxley has said, a scientific "law" is "nothing more than the statement of the order in which facts occur," and I suppose no one will dispute the proposition that as long as any one is trying to further such a knowledge, either of external appearance or any other attribute of insects, he is, *ipso facto*, an entomologist. I expect, however, most of us will doubt whether the definition quoted applies even to most collectors; such persons seem as a rule to be imbued with a sort of commercial spirit and respect for public opinion which is very far removed from that of the pure searchers after truth that Rev. W. Claxton would have us believe they really are, *e.g.* the collecting of varieties, which has become fashionable of late years, has been pointed to as a more scientific mode than the old one of preserving normal specific types, and regarding all departures therefrom as worthless; and no doubt this is a true view, but nevertheless the scene often seems to have been merely shifted from specific types to varietal types without changing the background, with the result that the less striking intermediate forms are not considered as good as the extreme forms, and this has in some cases led to a struggle among varieties for a place in our cabinets, much to the detriment of those unfortunate specimens which have been left unnamed: this is, of course, by no means universally applicable, and it often arises from a want of space; but it is surely calculated to improve our knowledge to a greater extent, if we limit the number of species we collect and study all their varieties, than if we collect a large number of species and necessarily limit ourselves to a few varietal types. There is also a prejudice common to, I think, most collectors, that a specimen is very nearly useless unless in perfect condition; and the way in which a valuable specimen is sometimes discarded, when its antennæ are missing or one wing is chipped, because it "spoils the look of the series," is, to say the least, unscientific. Such vagaries as these often completely invalidate assumptions drawn from collections as at present constituted, and it is perhaps noteworthy that, until more rational methods are employed, only those who are collectors themselves are in a position to "apply their knowledge to the deducing of general laws." Another case I should like to draw attention to, concerning the addition to our scientific results that might result from a sacrifice of the look (and commercial value) of a specimen on the altar of knowledge, is that of "gynandrous" forms. If those who are fortunate enough to meet with such were either to dissect, or cut sections through, the abdomen, a great deal might be learnt of the dependence of secondary sexual characters on the development of the sexual organs. I have already taken up too much valuable space, but I hope I have shown how useful it is for every entomologist to be a collector, although, of course, I quite agree with Mr. Harcourt-Bath (*ante*, p. 293) that some collectors have no more claim to be entitled entomologists than postage-stamp collectors have to be entitled geographers, or coin-collectors historians. I think it may be interesting to note Darwin's opinions on collectors. He says, in a letter to Sir J. D. Hooker:—"It is an old and firm conviction of mine, that the naturalists who accumulate facts and make many partial generalisations are the *real* benefactors of science. Those who merely accumulate facts I cannot very much respect" ('Life and Letters, C. D.' vol. ii. p. 225).—F. P. Bedford; King's Coll. Camb. Nov. 16th, 1896.

Ante, p. 330, we have "the first instalment to the list" of those "who professed a profound contempt for the mere collector" before us. It seems somewhat sad to bring forward such an unchristian feeling on the part of one who has passed from among us; still it is rather amusing that no *living* entomologist has the courage to confess "profound contempt" for a rather large number of his inoffensive fellow-creatures.—(Mrs.) E. S. Hutchinson; Grantsfield.

On Rearing Acherontia atropos.—May I add a contribution to the queries, information, and discussion going on in the 'Entomologist' upon the method of treatment best calculated to obtain the perfect insect from the pupa of *A. atropos?* My friend the Rev. Augustine Chudleigh, of West Purley, Wimborne, consulted me, in August last, upon the above point, as he was then feeding a nearly full-grown larva. I recommended him to adopt the "forcing" system, and below I add verbatim his report upon the matter:—

"I kept the pupa, as you directed, on the verge of stewing; in a roll of flannel, open at the ends, it lay on two quarts of earth which three-quarters filled a large flower-pot. The whole was enveloped in a wool rug, as in a great 'tea-cosy.' To keep up heat and damp, and to keep down fungus, I poured half a pint of boiling water on the earth on alternate days, and stood the whole affair for a couple of hours on the stove on the intermediate days. While these fiery ordeals were going on I kept the pupa in its flannel in a box in my breast pocket. On Oct. 5th I heard a mouse-like squeak coming from under the rug, and on unfolding it a brisk healthy moth climbed on to my hand. I lodged it under my large microscope-shade of thin glass, with beech-sprays to climb on, and I fed it on honeycomb and a doll's saucer of water. As days went by the colours improved wonderfully; the skull and bones—not crossed—became singularly distinct, far better than on any museum specimen I have seen. On the 10th, when I had got a good diagram and notes of the insect, and when everyone in the house had studied it to the full, I let it fly, about dusk. I was surprised at the strength of its flight, but it had a bat-like flittering; and I can quite believe that I have seen many a 'death's-head' on the wing, and have set them down as bats."

The above may, I think, be taken as an extreme instance of the forcing method—equable heat, moisture, and care to prevent fungoid growths. At the same time I had myself a larva of this moth, and determined to adopt the ordinary method by which I have in past time bred several of the perfect insects in the following spring. My larva on this occasion buried itself at the bottom of a flower-pot of friable earth, kept damp and out of doors, but not *wet;* it formed a sarcophagus considerably larger than itself, and then changed to a pupa. After several weeks I carefully broke the sarcophagus, in which the pupa lay, and have kept it since that in a large biscuit-tin, in a room where, with a fire every day, the temperature varies from 48° to 55°. It is still a pupa, bright-coloured and lively. I am careful to note whether any appearance of mould appears on the earth, and to keep it just damp. Whether this method will be as successful as Mr. Chudleigh's remains to be seen.—O. P. CAMBRIDGE; Bloxworth Rectory, Oct. 29th, 1896.

GONOPTERYX RHAMNI IN IRELAND.—I believe I am right in saying that this butterfly does not occur in Ireland, neither do either kinds of buckthorn. It has been "reported" from Killarney, but it is more than doubtful. I determined to try and introduce it in the vicinity of Tipperary, and, by only planting the buckthorn over a small tract of country, to see whether a small, self-sustaining colony could not be formed. In 1890 I obtained 1000 plants of *Rhamnus frangula* from Messrs. Dickson's, Chester, and had them planted about the place among the shrubs and woods. About half of them did well, the rest succumbing to the rabbits and unfavourable soil. In 1894 I planted 1000 more, with about the same result. A few plants of *R. catharticus* were mixed with these, but did not do well. In August, 1894, Mr. Cooke, of Museum Street, sent me about 250 of the butterflies, and these I turned out about the place. The weather was very unfavourable, and I hardly saw any more of them that year. I left for India that autumn, and only returned in May this year, and there was no one to observe whether they had been seen in 1895. About the first week in June I was over in Ireland, and I found the larvæ feeding on almost every buckthorn bush in the place. Some bushes, quite isolated, had been discovered just the same. In a walled-in garden I had placed about half a dozen bushes of *R. catharticus* by themselves; these had been patronised too. I observed one very late female depositing eggs. My next visit was at the end of August. Whenever the sun was out *G. rhamni* was out too, and one morning I should think I could have netted about fifty, nearly all males; from which I infer that the females lie low in the autumn. The ground over which the bushes have been planted is rather less than 500 acres, partly plantation and partly open ground covered with bracken, &c. The buckthorn bushes do not do well, and I doubt there being more than 800 healthy ones growing. This means they are pretty widely scattered. The butterflies are generally to be seen feeding on thistle-heads, black knapweed or scabious, and have formed three or four distinct colonies; at least, so it seemed in the autumn. In my opinion the butterfly is now thoroughly established, and, as long as the food-plant continues to grow, it should thrive. Their power of scent (?) must be wonderful for a limited number of butterflies, turned out in a strange land, after an interval of some months, succeed, first to find each other, and then to find the scattered bushes.—E. B. Purefoy, 16th Lancers.

Polia nigrocincta.—In reply to Mr. Thorpe's question, "Is it usual for a portion of the ova of *Polia nigrocincta* to hatch out in the autumn?" (Entom. xxix. 287) I answer no; but—as the boy said when asked if it always rained in the north, "No, sometimes it snaas" (snows)—I have known *P. nigrocincta* eggs to hatch partially, exactly as Mr. Thorpe's are described to have done; but if your readers will refer to the 'Entomologist's Monthly Magazine,' vol. vi. p. 60, it will be seen that the whole brood is known to "sometimes" hatch out in autumn and hybernate small, &c.; and in the 'Entomologist,' vol. x. p. 20, Mr. James Leather states that over 200 eggs deposited by a bred female of *Polia nigrocincta* hatched out on April 20th, 1876, and concludes, "My chief object in sending these notes to the 'Entomologist' is that they may *settle the question* whether or no the larva hybernates. It has been stated that such is the case. This is now proved not to be so," &c. Our old friend H. D. (Ent. Mo. Mag. vi. p. 90) says Mr. Gregson has certainly made a "mistake in his accounts of the larva of this species." But no mistake was made; and now, after twenty years, we seem to be all right, and the genus *Polia* wrong; for if all Polias "should hatch in spring only," then *nigrocincta* is not a *Polia:* sometimes it "snaas," that's all! Nevertheless, Mr. Thorpe's fact and question bring out how little we know, reminding us of the old fable, "Once there was a wise man and a fool; the wise man studied his subject and decided; the fool *decided!*" Old entomologists will remember *Polia occulta* in our books and lists. At that time we had nine Polias in our lists; six of them have been deleted, and a now dubious one added, *nigrocincta*, leaving *chi*, which certainly, under my care, at various times has hatched out in the autumn just as *nigrocincta* has repeatedly done. If all Polias "only hatch in spring," then we can only retain *flavicincta* as representative of the genus *Polia* in our lists. I may say I never bred *flavicincta*, nor do I know anything about its morphology. It may interest your young readers to know that I have before me as I write *Aplecta* (*Polia*) *occulta* just stretching from pupa, and five or six pupæ showing above the soil they pupated in. In other large flower-pots I have larvæ full-fed, and two lots of small larvæ will hybernate; all bred from one large batch of eggs deposited in the middle of last July, and fed on common dock. One of two friends here on Thursday night last said that all the *occulta* larvæ I gave him went down, and one perfect specimen appeared in September, another two weeks ago; and the other said, "My larvæ are all down but two, but I have not got any imagoes yet" (both lots were fed indoors on dock). Another friend wrote me from Yorkshire on the 21st inst., "All the larvæ of *occulta* that you sent me, except three or four—one-third grown—are safe down. I fed them on elder and sallow, which they seemed to prefer to any other food." I refrain from further illustrations of how little we know, to save me trouble and you space.—C. S. Gregson; Rose Bank, Fletcher Grove, Liverpool.

CAPTURES AND FIELD REPORTS.

Polia nigrocincta in Cornwall.—I captured a female specimen of this species at the Lizard on Sept. 18th.—Arthur P. Jenkin; Redruth.

Anosia menippe (plexippus) in England.—My sister, whilst at the Lizard, Cornwall, last month, states that she saw a specimen of *Anosia plexippus* [*Anosia menippe*, Hübn., *ante*, p. 188]. She was sitting close to the edge of the cliff when the insect sailed slowly by her, so close that she could plainly see the markings on its wings. She was unable to catch it, having no net and being impeded with painting appliances. I do not think it likely that my sister was wrong, as the insect is not one to be easily mistaken, and, moreover, she knows it well by sight, having been present when my brother and myself took three specimens eleven years ago, two of them in almost exactly the same spot as she now reports, and she has seen the specimens many times since in our collection. Our previous capture is reported, Entom. xviii. 291. I should be very much interested to hear if any other appearances have been recorded this autumn.—Arthur P. Jenkin; Redruth, Oct. 13th, 1896.

Pieris brassicæ.—In view of my previous note (*ante*, p. 126) it may not be without interest to record the reappearance of this species in this locality. No specimens of the first brood were seen, although searched for with care. The first specimen of the second brood was noticed on July 9th, from which date specimens were observed almost daily for several weeks, the last being seen on Aug. 21st. It occurred, however, in very limited numbers, in fact, not more than about fifty specimens being seen in all. Males and females seemed to be in about equal numbers. Neither larva nor pupa has been met with.—W. Grover; Guildford, Nov. 1st, 1896.

Lycæna argiolus.—I can corroborate the note of Mr. Jefferys (*ante*, p. 333) respecting the unusual abundance of *L. argiolus*. In this district the first brood was much commoner than usual in May; but it was at least three weeks late. I have never met with a second brood here until the present season; it was out (in even greater numbers than the first) by July 15th. It was particularly abundant about a thick hedge which runs along the top of the chalk ridge east of the town. There is practically no holly and very little ivy there; and when they were not sipping the nectar from the bramble-flowers, it was observed that the common buckthorn (*Rhamnus catharticus*) was in almost every case chosen as a resting-place, so it is more than likely that that shrub was the food-plant in the present instance. The most remarkable thing was the extreme scarcity of the females, the proportion seemed to be about one female to a hundred males.—W. Grover; Guildford, Nov. 1st, 1896.

Rhopalopsyche nycteris in England.—An example of this species was caught by one of my sons at Exmouth some time since. It has been identified by Sir George Hampson at the British Museum. Doubtless it has been imported accidentally into England, but the occurrence is genuine.—Frank Stone; 94, Palace Gardens Terrace, W., Nov. 9th.

Notes on the Rhopalocera.—That the past season has been rather eccentric as regards the time of appearance of Rhopalocera the following will testify:—*Lycæna icarus*. Two specimens were captured on April 17th.—*Euchloë cardamines*. A male was seen as late as June 13th.—*Pieris brassicæ*. Larvæ feeding during the middle of October.—The Vanessidæ were very scarce, with the exception of *V. urticæ*, which was, however, abundant in the first brood. The primary cause of the extreme scarcity of the three usually common species seems to have been due to the very wet weather at the time when they usually emerge; from Aug. 21st till now, as I am writing, there have been only about nine days without rain; the weather during the whole time was cool, and there was but little sunshine. Although I kept a sharp look-out I only observed four specimens of *V. atalanta*, about a dozen *V. urticæ* (second brood), and not a single specimen of *io*. Larvæ of *urticæ* and *atalanta* were abundant enough; I bred some numbers of both. All were found on or about Aug. 27th (the time when imagines are usually pretty freely on the wing). The first *urticæ* emerged Sept. 22nd; last, Oct. 10th. First *atalanta* Sept. 27th; last emerged rather earlier than those of the other species. Both insects were placed under exactly the same conditions, being reared indoors. The district which I am working does not seem to produce any species out of the common, the best capture this year being two *Vanessa c-album* last July at bramble-blossom.—A. D. Imms; Linthurst, Oxford Road, Moseley, Worcestershire, Oct. 12th, 1896.

Notes on Orthoptera.—On Aug. 8th last, near Christchurch in Hants, I met with *Ectobia panzeri*, Steph., our smallest cockroach, in some numbers. They were found under dead seaweed and other rubbish, but a few yards from the shore, and on ground that would apparently be often washed by the sea itself. They were very active, and as soon as uncovered hurried away out of sight. The females were, perhaps, rather commoner than the males, and many specimens of both sexes were dark, especially in the legs. In the New Forest, at the beginning of August last, *Nemobius sylvestris*, Fabr., the smallest of our crickets, was very common near Brockenhurst, though some patience was required to catch any number, for they run about very rapidly amongst the dead leaves and other rubbish, and occasionally vary their movements by short hops of about nine or ten inches in length. While catching *N. sylvestris* I secured two specimens, a male and a female, of *Thamnotrizon cinereus*, L., a somewhat singular-looking, almost wingless grasshopper, but saw no more than the two. During October I have been receiving considerable numbers of *Periplaneta australasiæ*, Fabr., the latest of the cockroach tribe to establish itself in these islands. They came from Kew Gardens and from Bishop's Waltham in Hants, and since the consignment consisted of insects, both male and female, in all stages of development, it is clear that they are holding their own in both localities. I noticed that the females are somewhat larger than the males; and have the yellow border to the pronotum more pronounced than in the latter sex. On Nov. 7th I received from the Royal Horticultural Society's Gardens at Chiswick a finely-grown specimen of the handsome cockroach, *Periplaneta americana*, L. As I received no memorandum with it, I cannot say whether it is thoroughly established there.—W. J. LUCAS.

BRYOPHILA MURALIS FROM S. DEVON.—This pretty moth has been fairly plentiful this season on the walls around Dawlish and Starcross. Mr. Bignell informed me that he took it in that locality on July 1st, but I found them still in splendid condition up to the end of August. Just ten years ago I took a long series of the dark brown form, which I exhibited at the South London Entomological and Natural History Society. They were confined to an old wall skirting a market-garden at Dawlish. The following year this wall had disappeared, in order to make room for lodging-houses, and I have never met with the same form since, although I have repeatedly looked for them. My specimens of this season are all dark green with a bluish tint.—J. JAGER; 180, Kensington Park Road, W., November, 1896.

SCARCITY OF INSECTS IN AUGUST.—From Aug. 12th to 19th I was in North Devon, and from the 20th to the 31st in the New Forest, keeping a very keen look-out for insects during the whole time, but never before have I seen so little in that way. Butterfly life was almost entirely absent; even the commonest species, such as *Lycæna icarus* and *Vanessa atalanta*, hardly putting in an appearance. *Pararge egeria* alone showed up in anything like its usual numbers. In the New Forest, where I was staying with an entomological brother, Canterton being our headquarters, we really worked hard, sugaring laboriously every night, the result being a good series of *Amphipyra pyramidea*, and a few still commoner Noctuæ. In desperation we turned at last to pupa-digging, where luck was not quite so dead against us, a comparatively few hours' work producing over two hundred pupæ of various species. I believe there is usually little to be done in the way of collecting in the New Forest at the end of August, and the early season probably accounts for any scarcity of insects beyond the average; but the remark does not apply to Devonshire, or the west country generally, an area with which I have had a long entomological acquaintance. The phenomenon most difficult to explain was the utter absence of the larger Vanessæ. Since leaving the New Forest I have been in Yorkshire (Wharfedale) and Scotland (east coast), but entomological work has been quite out of the question.—HAROLD HODGE; 6, Crown Office Row, Temple.

ACHERONTIA ATROPOS IN DEVON.—From the records in the 'Entomologist,' larvæ of this species seem to have occurred abundantly in many parts of the country. As Devonshire has not been mentioned, I may say that during my stay at Starcross in August and September this year, several of these larvæ were seen, taken and killed. In one instance a girl threw a brick at a larva, under the impression that it was a young snake. I obtained one which went to ground about August 20th, Having at different times failed to rear the species, I adopted the plan suggested by Dr. Livett, of Wells, and alluded to *ante*, p. 312, with the happy result that a perfect male imago emerged on the 30th ult. *A propos* the killing incident, I am reminded of what happened in the village of Radwinter, in Essex, some years ago, a note on which I sent to the 'Entomologist' soon after its occurrence. In this case a nightshade overgrowing a shed in a farm-yard had been completely stripped of the leaves by these larvæ. The villagers, believing them to be locusts, one day made the occasion a kind of holiday, and amused themselves by killing every one of them. Great was their chagrin when I enlightened them on this point, and informed them that they were worth about a shilling each.—J. JAGER; 180, Kensington Park Road, W., November, 1896.

ACHERONTIA ATROPOS.—Larvæ and pupæ of *Acherontia atropos* have been taken this season at Clevedon, Somerset, and at Cirencester, Gloucestershire. Some found at Clevedon, and reared by a friend who forced the pupæ a little, came out at the end of September. A pupa just given me in Gloucestershire, still alive, I propose forcing, which has not been done up till now. Is it not the case that hot, dry summers appear to be conducive to the prevalence of this moth?—T. B. JEFFERYS; 17, New King Street, Bath.

ACHERONTIA ATROPOS BRED.—Two larvæ of *A. atropos* were taken on Aug. 3rd last, at Rivenhall, Essex, and were sent on by a friend. One imago emerged on Oct. 23rd, and the other on the 29th of the same month; both are very fine specimens.—J. R. CATTLE; 115, King Edward Road, Mare Street, E.C., Nov. 9th, 1896.

CATOCALA FRAXINI IN THE ORKNEYS.—A specimen of the above-named rare insect was captured by Mr. James Shaw, shoemaker, of 7, Bridge Street, Kirkwall, on Tuesday, Sept. 1st, on a telegraph-pole, below the farm of Laverock, on the road between Stromness and Kirkwall. My correspondent (Mr. John Flett, of Kirkwall), who has obligingly furnished me with these particulars, also enquires in the course of his letter,—"Would not the great prevalence of south wind this season account for the insect being found so far north?" I deeply regret having to add that Mr. Shaw passed away on Sunday, Sept. 13th, about a fortnight after this recorded capture. I may also state that the said specimen of *C. fraxini* was forwarded to me by parcel-post, and is in wonderfully good condition, considering that it was not bred from the chrysalis.—(Rev.) F. W. WALKER; Oct. 15th, 1896.

CATOCALA FRAXINI AT SCARBOROUGH.—A worn specimen of *C. fraxini* was captured in the Spa ground, Scarborough, on Oct. 3rd, 1896, by Mr. H. R. E. Grey.—J. H. ROWNTREE; Nov. 18th, 1896.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*October* 21*st*, 1896.—Prof. Raphael Meldola, F.R.S., President, in the chair. Mr. J. J. Walker, R.N., exhibited a specimen of *Emus hirtus*, L., taken at Gore Court

Park, Sittingbourne, Kent, on May 30th last. Mr. W. B. Spence sent from Florence, for exhibition, some specimens of a cricket, *Gryllus campestris*, in small wire cages, which he stated were, in accordance with an ancient custom, sold by the Italians on Ascension Day. Mr. F. Enock exhibited a specimen of the curious aquatic Hymenopteron *Prestwichia aquatica*, female, which Sir John Lubbock first captured in 1862, but which had not been recorded since that date until its rediscovery in May, 1896. Mr. Enock said that the male had remained unknown until June last, when he captured several swimming about in a pond at Epping. The male was micropterous, and, like the female, used its legs for propelling itself through the water. Mr. Tutt exhibited a beautiful aberration of *Tephrosia bistortata* (*crepuscularia*), in which the ochreous ground colour was much intensified, and the transverse shade between the median and subterminal line was developed into a brown band; the transverse basal, median, and subterminal lines on the fore wings, and the median and subterminal lines on the hind wings, being strongly marked in dark brown. It was taken by Mr. J. Mason at Clevedon in March, 1893. Mr. Tutt also exhibited the cocoons, pupal-skin, and aberrations of the imago of *Zygæna exulans*. The cocoons were spun upon one another, five in a cluster, and Mr. Tutt stated that the species was exceedingly abundant in the pupal and imaginal stages during the first week of August on the mountain slopes above Le Lautaret, in the Dauphiné Alps, at from 7000 to 9000 feet elevation. The pupa-skin was very similar to those of other Zygænids. The imagines exhibited were all aberrations, and consisted of females of the ab. *flavilinea*, with bright yellow nervures; a large male and several females of the ab. *striata*, with the red spots more or less confluent and developed into streaks; also, a unique female aberration, in which the wing from the base to far beyond the centre was entirely crimson. Dr. Sharp exhibited a specimen of a lepidopterous insect that had been alluded to in the 'Entomologist's Monthly Magazine,' Sept. 1896, p. 201. It was a caterpillar which had received the eggs of a parasite on the anterior part of the body; the abdomen, nevertheless, went on to the pupal metamorphosis, while the head and thorax remained attached to it in the caterpillar stage. He also called attention to some peculiarities in the pupa of *Plusia moneta*, pointed out to him by Mr. Fleet; in this species the pigmentation varies greatly in extent, and is sometimes entirely absent. Mr. Blandford called attention to the recent discoveries relating to the Tsetse fly, made by Surgeon-Major Bruce in Zululand, which proved that this insect affected animals by infecting them with a parasitic Protozoon. The parasite was communicated from wild animals to domestic animals, and was probably more widely distributed than was generally believed, it or a closely allied form having been found in India and England in sewer rats. He said that Surgeon-Major Bruce had proved that the Tsetse fly was pupiparous, which was of importance as affecting the classification of the Diptera. Dr. Sharp said that in his opinion the Tsetse fly would cease to be troublesome with the advance of civilization. Mr. C. G. Barrett exhibited the pupa-skin, cocoon, and eggs of *Hesperia comma*, L., found on chalk-hills near Reading by Mr. A. H. Hamm. He also exhibited and remarked on a series of both forms of *Tephrosia crepuscularia* and *T. biundularia*, showing an unbroken line of variation from brown to white and also to grey and black. In addition, he showed several second-brood specimens of both forms, obtained in the past summer by Mrs. Bazzett, of Reading. Mr. Tutt and Mr. Fenn made some remarks on the specimens exhibited. Mr. Tutt read a paper entitled "On the specific identity of *Cœnonympha iphis* and *C. satyrion*," and exhibited a long series of specimens. The Rev. T. A. Marshall communicated a paper entitled "A Monograph of British Braconidæ," part vii. Mr. T. D. A. Cockerell communicated a paper entitled "New Hymenoptera from the Mesilla Valley, New Mexico." Mr. E. Meyrick contributed a paper entitled "On Lepidoptera from the Malay Archipelago." Dr. Sharp read a paper, by Mr. G. D. Haviland and himself, entitled "Termites in Captivity in England."—H. Goss and W. W. Fowler, *Hon. Secs.*

November 4th.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. McLachlan exhibited a collection of the cast nymph-skins of more than one-third of the species of European Dragonflies from the Département de l'Indre, France, sent to him by Mons. René Martin. Two or three of the species had been reared in an aquarium, but the identification of most of them has been secured by finding the imago drying its wings in the immediate vicinity of the cast skin. Mr. R. Adkin exhibited a long series of *Acidalia marginepunctata* taken on the sea-coast at Eastbourne, Sussex, during the past eight summers. The series included examples of a bone-coloured form with slightly indicated transverse markings; others much dusted with black scales giving them a deep grey tone, with well developed markings; and sundry forms intermediate between the two; also three taken this year, in which the whole of the wings, with the exception of a pale submarginal line, are densely covered with black scales, giving them a similar appearance to the so-called "black" forms that are found among some of the species of *Boarmia* and *Tephrosia*. Mr. Horace St. John Donisthorpe exhibited a female specimen of *Dytiscus circumcinctus*, Ahr., with elytra resembling in form those of the male. He said the specimen had been taken in Wicken Fen in August last. Mr. Tutt exhibited a specimen of *Mellinia ocellaris* recently taken near Southend, together with a specimen of *M. gilvago* for comparison; also four specimens of *Argyresthia atmoriella* taken by Mr. Atmore last June at Lynn, Norfolk. Mr. Tutt also exhibited a long series of a *Melampias* which he had captured at Le Lautaret, in the Dauphiné Alps, at an elevation of 7000–8000 feet. He observed that the specimens exhibited were peculiar in some very important particulars, combining some of the characteristics of *Erebia* (*Melampias*) *melampus* and *M. pharte*. He said his attention had been first drawn to this form by some fine examples captured by Dr. Chapman and himself on Mont de la Saxe in 1895. Compared with the Tyrolean examples of *M. melampus*, this form showed a tendency to a lengthening of the fore wings and to an obsolescence of the black dots, thus approaching *M. pharte*, but the females presented none of the typical characters of the female of *M. pharte*. On the whole, he felt satisfied that the Mont de la Saxe specimens were a form of *M. melampus*. Mr. Elwes observed that though all the continental butterflies had been so long studied by European entomologists, he did not think the form exhibited by Mr. Tutt had been hitherto noticed. He considered that Mr. Tutt had made out his case, and he agreed in the conclusion at which he had arrived. Mr. McLachlan, Herr Jacoby, and Professor Meldola continued the discussion. Mr. E. Ernest Green exhibited a typical specimen of *Ephyra omicronaria*, together with what he believed to be a remarkable melanic variety of the same species, taken by Dr. Dudley Wright at Pegwell Bay, near Ramsgate, in September last. Some of the Fellows present, after an examination of the specimen, expressed an opinion that it was a variety of an *Acidalia*, and not of *Ephyra omicronaria*. Mr. Goss stated that Mr. Harry Fisher, the botanist to the Jackson-Harmsworth expedition, had returned to England. He hoped that he would have been present at the meeting to exhibit a few minute Diptera and other insects which he had collected in Franz Josef Land. Mr. McLachlan made some remarks on insects and flowers in high latitudes, and Mr. Elwes, Sir George Hampson, and Professor Meldola also commented on the subject.—H. Goss, *Hon. Secretary.*

South London Entomological and Natural History Society.—*October 8th*, 1896.—T. W. Hall, Esq., F.E.S., Vice-President, in the chair. Mr. Ficklin exhibited several species of Lepidoptera set in their natural positions of rest, thus showing the pattern of the transverse markings which adapted them to their surroundings. Mr. Carpenter, a male specimen of *Polyommatus* (*Lycæna*) *icarus*, with a completely bleached hind wing, from Folkestone; several female examples of *Pararge megæra*, bred from Ranmore Common, having a tendency to form a broad black median band; and a bred series of *Chrysophanus* (*Polyommatus*) *phlœas* from Abbot's Wood, having well developed blue spots on the secondaries. Mr. H. Moore, two large species of Orthoptera from Florida, viz. *Romalea microptera* and *Cyrtacanthacris subsittaca*. Mr. J. T. Carrington, *Calophasia platyptera*, a species of moth new to Britain, taken by himself between Shoreham and Brighton on Sept. 14th, 1896. The species is closely allied to the "shark-moths," and is a native of Central and Southern Europe. The larvæ feed upon toadflax. Mr. Ashdown, a specimen of the rare Coleopteron, *Molochus minor*, from Mickleham; and a black var. of *Toxotus meridianus* from Surrey. Mr. Adkin, a bred series of *Calocampa vetusta* from Sutherland; and a bred second brood of *Acidalia virgularia* (*incanaria*) from Brockley. Mr. Lucas, a hitherto unnoted variety of *Pyrameis* (*Vanessa*) *atalanta*, having the indistinct deep black blotches which are interior to the red marginal band of the hind wings, with well-marked blue centres. It was captured near Ipswich by Mr. H. L. Hearsum, of Kingston. Mr. Barrett, a pupa-case and cocoon of *Pamphila* (*Hesperia*) *comma*, which had been found by Mr. Hamm, of Reading; and also some eggs which had been deposited on stems of grass by an observed female. A discussion took place as to what was the usual food-plant of the species. The general opinion was that it was a grass-feeder, as are most Pamphilids. Mr. C. A. Briggs, a fly taken from a starling, presumably *Ornithomyia avicularia*, one of the Hippoboscidæ infesting birds. Mr. H. J. Turner, a living specimen of *Uropteryx sambucata*, taken in his garden on Oct. 8th, and no doubt a second-brood individual.

October 22*nd*.—C. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. A. T. Potter, of Whangarei, Auckland, New Zealand, was elected a member. Mr. R. Adkin exhibited a series of very beautifully-marked specimens of *Hadena adusta* from Shetland. Mr. Ficklin, bred specimens of *Luperina cespitis*, from larvæ taken on grass-stems in the spring. He suggested that their small size was due to their proper food being grass-roots and not the green blades. A large number of specimens of *Tephrosia crepuscularia* and *T. biundularia* were shown by Messrs. Tutt, Henderson, Barrett, Auld, Mera, Mansbridge, De V. Kane, Tunaley, H. Williams, and Chittenden, forming such a collection of forms as, in the opinion of all present, had never before been brought together. In reply to Mr. Barrett's re-assertion, based on Mrs. Bazzett's captures, that these two were one species, Mr. Tutt read a very exhaustive paper. He assumed that the earlier species should be termed *T. bistortata* and the later one *T. crepuscularia*, as Mr. Prout asserted, and said that the difference of opinion among entomologists was largely a matter of the definition of a "species." They each had distinct life-cycles, distinct facies, and one had seasonal dimorphism, besides which each bred true to its own race. He showed that errors had arisen from statements made on insufficient data, and from too much reliance being placed on various authors' writings, such as those made in Newman's 'Moths.' He reviewed the discussion which took place some ten years ago in the magazines, and said that the consensus of opinion then was the same as his own. The opinions of the chief opponents were then discussed in detail, especially the various contributions of Mr. Barrett to the discussion. He showed by quotations that Mr. Barrett had accepted the idea of two species until he recently received certain specimens and data from Mrs. Bazzett, including some supposed second brood *T. biundularia*. After stating that these were undoubtedly *T. crepuscularia* second brood, he referred to the evidence offered as to distinctness by Messrs. Porritt, Fenn, and Tugwell, who had bred both species, and pointed out the differences which separated the two. He showed that parallelism was not a sign of unity of species, nor was it right to compare dates of years like 1888 with 1893. He discussed the Scotch forms, and remarked that they more nearly resembled the German specimens. Mr. Henderson said that he had taken *T. crepuscularia* in the very woods where it was stated by Mrs. Bazzett not to occur. His experience and remarks agreed wholly with Mr. Tutt's, and he mentioned that the late Mr. J. A. Cooper had reared a second brood of *T. biundularia*. The remarks made by the other exhibitors all tended to support the case as put forth in Mr. Tutt's paper. Mr. de Vismes Kane sent an account of the occurrence of the only species *T. biundularia* occurring in Ireland, together with a typical exhibit. In reply to the vote of thanks, proposed by Mr. Barrett and seconded by Mr. Auld, Mr. Tutt said that the idea of species was simply a matter of utility; and as there were two distinct life-cycles it was more convenient to consider them as two species, although they might be very closely allied. Mr. Montgomery reported that there was considerable doubt about his record, on September 24th, that *Noctua ditrapezium* occurred in Yorkshire.

November 12*th*.—T. W. Hall, Esq., F.E.S., Vice-President, in the chair. Mr. R. Adkin exhibited long and varied series of *Acidalia marginepunctata* in illustration of his paper. Colonel Partridge, two dwarf, red, bred specimens of a second brood of *A. trilinearia* from Epping Forest. The annulated spots, which appear in the other members of the genus, were developed in these examples. Mr. Tutt had seen some of Mr. Merrifield's specimens bred under abnormal temperature, and they closely resembled these in the spots and colour. Mr. Auld, a specimen of *Zygæna loniceræ* from Chattenden, with semi-diaphanous under wings in part. Mr. Lucas, specimens of *Periplaneta australasiæ* from Kew Gardens and Bishop's Waltham, consisting of males, females, and immature (wingless) examples, and said that the females had the yellow ring to the pronotum wider than in the male. Mr. Tutt, (1) specimens of *Orrhodia vaccinii*, very close in their coloratian to ab. *glabra* of *O. erythrocephala;* (2) a series of *Zygæna exulans* from Le Lauteret, the smallest from about 9000 feet elevation where the herbage was sparse, the larger were from 7000 to 8000 feet elevation; (3) two specimens of *Lithosia lutarella*, of the deep yellow form found all over the high Alps (they were seen assembling in large numbers, one very warm damp morning, in company with *Acidalia flaveolaria* and *Cleogene lutearia*); (5) both sexes of *Acidalia ochrata*, and stated that our British species is the *perochraria* of Stephens; (5) a series of the very beautiful *Psecadia pusiella*, a Tineina found in abundance at La Grave, and looking much like a large form of *Cerostoma sequella.* Mr. Barrett, on behalf of Mr. Day, of Cheshire, exhibited a series of forms of *Tephrosia biundularia* taken in March and May; he also showed a very fine series of the Unst forms of *Noctua festiva* sent to him by Mr. J. J. F. X. King. Mr. Tunaley stated that he had frequently found late *T. crepuscularia* at the same time as early *T. biundularia* in Sutton Park, Birmingham. Mr. R. Adkin read a paper entitled "Notes on the occurrence of *Acidalia marginepunctata*, and observations on the early stages of the second brood of *Cyaniris* (*Lycæna*) *argiolus*." A discussion took place, Messrs. Tunaley, Tutt, Mansbridge, and Barrett taking part, all bearing testimony to the value of Mr. Adkin's close observation of the latter species.—Hy. J. Turner, *Hon. Report Sec.*

Cambridge Entomological and Natural History Society.—*October 16th*, 1896.—The President, Dr. Sharp, in the chair.—Exhibits:—By Mr. Jones, specimens of *Lycæna arion.* By Mr. Rickard, nest of a tree-wasp, and other locally interesting exhibits. By Mr. Fleet, two examples of *Caradrina ambigua*, and pupæ of *Plusia moneta* exhibiting remarkable peculiarities of pigmentation. By the President, a larva, believed to be of a species of *Hepialus*, which is at present doing much damage to vegetation in Northamptonshire; a pupa of *Sphinx convolvuli*, prepared to show the way in which the proboscis is folded in its case; also one of the colonies of white ants (*Calotermes domesticus*), exhibited a year ago, now *in extremis.* He said that one of the individuals had been transformed into an egg-producer, and specimens of the other Termites were seen in the spring carrying the eggs; the small colony had, in fact, established a "substitution queen," after the fashion described by Grassi.

October 30*th*.—The President in the chair. Exhibits:—By Mr. Rickard, a number of South African insects, including various Orthoptera of *Phymateus* and allied genera, and Hymenoptera; and a specimen of *Batracho tettix*, a very variable insect, whose colour is said to depend upon the nature of the ground in its neighbourhood. By Dr. Sharp, various stages of *Thysidopteryx ephemeriformis* from Washington, U.S.A., including some perfect insects which had emerged after their arrival in England. The President read a paper upon "Jumping Cocoons" (published simultaneously in the 'Entomologist' for November). He described the structure of the pupa and the mechanism by which it chisels and hammers its way out of the cocoon. He suggested that the "jumping" was produced by the efforts of the insect to free itself when the cocoon had by accident become detached from its moorings. Mr. Lamb remarked that the mechanics of the process were rather obscure.

Lancashire and Cheshire Entomological Society.—*November* 9*th*, 1896.—The President, S. J. Capper, Esq., in the chair. Owing to the Secretary, Mr. H. B. Jones, going abroad, Mr. J. N. Pierce undertook the duties until the end of the year. Mr. F. N. Pierce read a paper entitled "Are hybrids hermaphroditic? some recent investigations in the genitalia," illustrated by diagrams and preparations shown by the micro-lantern. The author stated that, in the specimens he had examined, whereas the male hybrids, although distinct from the parents, were perfectly formed and apparently capable of copulation, the female was hermaproditic, the genitalia containing the organs of both sexes. Dr. Ellis stated that in nature it was easier to produce males than females, and suggested that if the organs of females were more generally examined it would probably be found that instances of the male organs also being present would not be rare. Mr. Gregson exhibited varieties of *Abraxas grossulariata* and an *Aplecta occulta* bred by him that morning.—F. N. Pierce, *Hon. Sec.*, *pro tem.*

Birmingham Entomological Society.—*Sept.* 21*st*, 1896.—Mr. P. W. Abbott, V.-P., in the chair. Exhibits:—By Mr. R. C. Bradley, *Ephestia kühniella*, bred from larvæ sent from Liverpool. By Mr. G. W. Wynn, a series of *Orthosia suspecta* from Sutton Park; *Chœrocampa porcellus* (one) from Northfield; *Cymatophora duplaris* from Sutton; and *Luperina cespitis*, *Eugonia erosaria* (a series), *Pterostoma palpina*, *Notodonta ziczac*, *Grapta c-album* (a series of the pale second brood), and *Cerura bifida*, all from Wyre Forest. By Mr. E. C. Rossiter, *Acherontia atropos* from Norfolk; *Bombyx rubi*, nice brown specimens, from the Hebrides; *Acidalia imitaria* from N. Wales; *Thecla w-album* from Arley, where he had discovered it on the railway bank between Arley and Highley; it has not hitherto been known in the Birmingham district, excepting by a chance specimen, but was not uncommon in this district; also *Cœnonympha davus*, a series from the Hebrides; *Scodiona belgiaria* from the Hebrides; and *Nudaria mundana* from Arley. By Mr. J. T. Fountain, a fine series of *Selidosema ericetaria* from the Dorsetshire coast; *Papilio machaon* bred from Wicken larvæ; *Colias edusa* from Knowle, and var. *helice* from Dorsetshire; and a long fine bred series of *Gortyna ochracea* from various spots near to

Birmingham. By Mr. P. W. Abbott, a specimen of *Leucania vitellina*, which was taken by Mr. John Hodges at Freshwater, Isle of Wight, at sugar, the night of Sept. 8th, during a thunderstorm. By Messrs. A. H. Martineau and C. J. Wainwright, a number of insects taken at Wyre Forest during a few days spent together there at Whitsuntide: they included among the Hymenoptera, *Pompilus viaticus* and *P. spissus*, *Osmia spinulosa*, and *Passalœcus gracilis;* among the Diptera, *Conops vesicularis*, *Doros conopseus*, *Dioctria atricapilla*, *D. œlandica*, a nice series of *Chrysotoxum sylvarum*, *Syrphus nitidicollis*, and *Pipizella virens;* among the Lepidoptera, *Hadena genistæ*, *Tephrosia extersaria*, *Lobophora viretata*, and *L. halterata*. Mr. Wainwright showed and presented a map of the Birmingham plateau, as delineated by Mr. G. H. Kenrick for adoption as the Society's district.

October 19*th*.—Mr. R. C. Bradley in the chair. Exhibits:—By Mr. Bradley, a specimen of *Antithesia salicella*, arranged in a natural position of rest on an oak leaf to show its striking resemblance to a bird excretum. Mr. W. Harrison, the six females of *Lasius umbratus* taken in Edgbaston, only about a mile and a half from the centre of Birmingham; this capture was all the more remarkable as Mr. Martineau had never met with it in the Midlands, and although it was not usually an uncommon species, yet he did not know of any other record of it near Birmingham; also a specimen of *Vanessa l-album*, which had been taken by Mr. B. May, of Moseley, about the year 1877, at rest on a tree-trunk at Henley in Arden; the capture was discredited at the time, but there seems not the slightest reason to doubt its genuineness. Mr. May has long since given up entomology, and parted with his collection, all but this one specimen. Mr. Harrison also exhibited a continental specimen for comparison; that from Henley was decidedly smaller and darker. By Mr. A. H. Martineau, an imago and full-grown larva of *Ammophila sabulosa*, obtained under the following singular conditions: his brother watched the wasp engaged in burrowing at Newquay; after he had seen it make its hole, fetch a larva and put it in, lay an egg with it, and then fill up the hole, he caught the wasp, and dug up the larva, which was a fat green Noctua, and placed them altogether in a match-box, where he left them and forgot them. Some time afterwards, chancing to open the box, he found the wasp, but the Noctua larva had quite disappeared, and in its place was a full-grown wasp larva, which had hatched and developed under these uncongenial conditions.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

NONPAREIL ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*October* 15*th*, 1896.—Mr. Thos. Jackson in the chair. Exhibits:—By Mr. Huckett, living specimens of *Boarmia rhomboidaria;* and a live specimen of *Vanessa cardui*, which had only emerged that day. By Mr. Gurney, series of *Acronycta megacephala*. Mr. Harper, on behalf of Mr. Muncer, attracted a great deal of attention with a very fine variety of *Vanessa atalanta*, which he said had been bred from larvæ collected on the Hackney Marshes six weeks ago. The broad red band on the fore wings, which distinguishes the species, was quite straight in this specimen, and not semi-angular as in the type form, owing to the absence of one segment nearest the anal angle; the white spots on the fore wings above the red band were much larger and not so clear in outline, making them appear as though they had been put on with chalk and then accidentally smudged; on the end of the band nearest the edge of the wing there was a white blotch; the red margin on the hind wings was devoid of the four black spots found on the usual form; at the foremost tip on the hind wings there was a clearly-defined white spot. By Mr. Lusby, four specimens of *Chrysophanus phlœas*, in which the coppery gloss was of a very light hue; also showed several very small specimens of *Vanessa urticæ*. A discussion ensued on the subject of the hybernation of *Vanessa cardui*. Mr. Norman stated that his brother had taken very small larvæ in the late autumn, which upon being subjected to a microscopical examination he made out to be *Vanessa cardui*, and this led him to think that the species hybernated in the larval stage.—F. A. Newbery, *Reporting Secretary*.

OBITUARY.

Joseph Chappell.—By the death of Joseph Chappell, on October 3rd last, Manchester loses a high authority on all matters pertaining to entomology, and Lancashire a fine example of the many working-men naturalists. For upwards of forty years he not only collected, but studied and observed, after the manner of the true naturalist, the insects of the Manchester district. Of the Lepidoptera and Coleoptera of this district his knowledge was great, and he afforded valuable assistance in furnishing records for Dr. Ellis's 'Catalogue of the Lepidoptera of Lancashire and Cheshire,' and Canon Fowler's 'Coleoptera of Great Britain and Ireland.' Mr. Chappell was gifted with a wonderful facility for discovering insects new to his district. His find of *Lymexylon navale* in Durham Park will occur to every coleopterist; whilst amongst a host of discoveries in the Lepidoptera he made out the life-history of *Sesia culiciformis* on Chat Moss, obtained *Notodonta bicolor* in Burnt Wood, and was the first to detect *Tapinostola elymi* as a British insect. The latter insect was considered to be only *Leucania pallens* by the collectors who took it on the east coast, but he recognising it as a new species, advised Mr. Thorpe to visit the locality, which was done, with the result that a good series was sent to the late Mr. Henry Doubleday, and the species added to the British list. For many years Mr. Chappell worked as a mechanic in Sir Joseph Whitworth's works. About twelve years ago he suffered the loss of one of his legs, which had to be amputated in consequence of disease. During the Jubilee Exhibition at Old Trafford he was in charge of the exhibition of living silkworm-moths. His geniality of disposition endeared him to all his friends and acquaintances, and the generosity with which he distributed duplicates of his captures made him known (by name if not personally) to all our leading entomologists. Mr. Chappell was an honorary member of the Lancashire and Cheshire Entomological Society. His extensive and valuable collections had recently been purchased by Mr. C. H. Schill. He was in his sixty-seventh year.

THE

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> "By mutual confidence and mutual aid
> Great deeds are done and great discoveries made."

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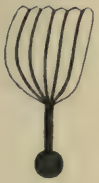
FUNGI PARASITIC ON BUTTERFLIES.

By J. C. Rickard.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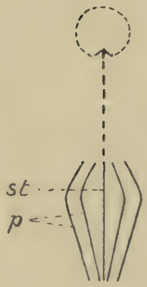

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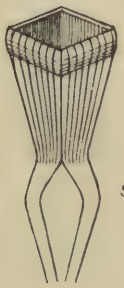
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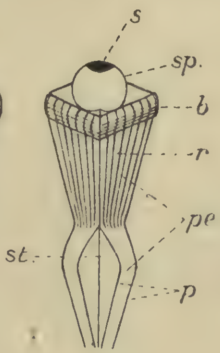

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On page 314 of the October number of the 'Entomologist' is a paragraph relating to this subject, entitled "Fungi or Androconia?" by Prof. J. B. Smith. In referring to Mr. Scudder's great work on Butterflies he characterises it as "magnificent." I regret not having had an opportunity of reading it, but am aware of its comprehensiveness, and through the kindness of a friend have been able to consult some of the plates. In a work of this magnitude it is not surprising that errors should creep in, but in spite of some mistakes I shall continue to regard it as "most magnificent" until I meet with a better work on the subject.

Prof. Smith refers me to plate 47, figures 1 and 2, which he states represent something "as nearly like a spore-formation in some kinds of fungus as can well be imagined." As those figures do not present any very striking fungoid characters, I think he must have meant plate 46, where figures 1 to 4 represent organisms similar to those found on some Satyrids. Prof. Smith goes on to say that he has "found his (Mr. Scudder's) pictures in every case absolutely correct."

Figure 4 on plate 44 represents a portion of the wing of *Speyeria idalia;* the objects in this figure that Mr. Scudder terms "feathered androconia" are really the rhizoids of a fungus, either represented from the under side, or else showing through the transparency of the overlying scales. Figures 39 and 40 of plate 46 are said to represent the androconia of *Pieris oleracea* and *P. rapæ*, but both figures are taken from mutilated or imperfectly developed examples. Of figure 40 (*rapæ*) I can speak positively from my own observation; whilst the *oleracea* example so closely resembles the parasite of *P. napi*, that I have not the least doubt of its imperfect condition; certainly, many examples, both of the *rapæ* and *napi* forms, minus their sporocarps, have come under my notice; but I have invariably found some on every slide examined in which this organ, the most important part, was developed and *in situ*. Figure 42 of the same plate is said to represent the androconia of *Laertias philenor;* this form differs from all the others figured by Mr. Scudder, and, speaking with reserve, I must say that in my opinion it represents an imperfect example. One would hardly suppose the vertical lines represented the striæ of an ordinary scale; neither do they; one of these lines represents the stem that bears the sporocarp, the remaining four are the ribs or paraphyses (figure 1). I have very little doubt that the figure represents the basal portion * of the peridium, the stem and sporocarp of a fungus nearly allied to that found on *P. agathina* (see *ante*, p. 171). Similar mutilated examples of the *agathina* fungus have come under my notice (figure 2).

My efforts to learn something of the later phases in the development of the *rapæ* fungus were only partially successful; the first male of this species procured this year had never used its wings in flight, its fungi presented some abnormal appearances. Nearly all possessed the sporocarp; some had no lobes, some only one, but the greater number had both. The most numerous and most instructive examples were those which possessed horn-like processes arising from the apices of the inner sides of the lobes; these "horns" varied in length, from a mere point to about one-third the breadth of the fungus; they are probably re-absorbed, as there was no indication of their dehiscence; their function undoubtedly being to afford protection to the growing sporocarp. The examination of the wings of an example immediately after emergence, and of several dissected from the chrysalids, showed the fungus to be more developed than they were in the first specimen examined, in which the butterfly seems to have matured more rapidly than its parasite.

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* Figured upside down.

On page 171 I remarked that the lobes of the *napi* fungus had probably become distorted in drying; this is not an exact explanation, the time the butterfly had been dead having little or nothing to do with the contraction of the lobes, which seems to be characteristic of this and some other forms—the *oleracea* fungus for instance. The contraction of the lobes affords an interesting case of the production of mechanical effects by a slight physical modification (shrinkage) of the parts concerned; the function in this instance being to facilitate the dehiscence of the sporocarp; this follows from the circumstance that the lobes on contracting overlap each other, so that they no longer occupy the same plane, but are deflected somewhat from the central line; thus one lobe presses in one direction on one side, and the other lobe in the opposite direction on the other side, imparting to the central organs a sort of twist, which tends to cause a rupture at the weakest part of the structure, which in the case under consideration is usually at the junction of the stem and peridium, where, as I pointed out (*ante*, p. 230), there is a "hilum." Exceptional examples are met with in which the lobes have contracted before the sporocarp has developed sufficiently to receive the pressure on what may be termed its "equatorial"* region. In these cases the lobes are found pressing the sporocarp down to the bottom of the notch formed by the lobes, where it may be seen firmly clasped in their embrace. Why the very similar fungus of *rapæ* and others do not exhibit the like phenomena is difficult to explain; for some unknown reason it seems that the function performed by the contracting lobes is not required in such species.

No reference has hitherto been made to the sexual organs which must necessarily have existed prior to the development of the fungus. I acknowledge that I have not even sought for these objects, believing that both my optical and manipulative powers would prove insufficient for a successful investigation; but certain structures that are probably of this nature have been described by others. A German biologist, whose name even is unknown to me, has described and figured in a German scientific journal what he calls "mother-cells"; he discovered them between the membranes of the wing. An eminent entomologist, in describing these bodies to us, sketched a rough section of a wing, and then proceeded to represent the "mother-cells." I noticed he gave a spiral twist to his figures. "Are those glands of some kind?" I asked. "No," was the reply; "their function is unknown, but they are said to communicate with the exterior of the wing." If we turn to the illustrations generally found in books on cryptogamic botany, we will probably find figures representing the conjugation of certain fungi, that bear so close a resemblance to these "mother-cells," that I am tempted to regard the latter as the sexual organs of the fungi found on the wings of certain butterflies. The conjugating cells of Erysiphe and Eurotium are cases in point; but all this is conjectural.

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* This is hardly the right term to use; what it was intended to convey was, that the pressure being applied in opposite directions on either side of an imaginary vertical axis caused a partial rotation or "twist" of the central organs.—J. C. R.

In the last sentence of Prof. Smith's paragraph (Entom. xxix. 314) he remarks, "except for their greater delicacy of structure, these androconia do not differ from the other wing-scales." On a previous occasion (Entom. xxix. 230) I pointed out that certain differences do exist; but if we compare the fungi with admittedly androconial scales as, for instance, those of *Callidryas florella* (Entom. xxix. 302), we shall find that there is not even a trace of similitude between them.

In conclusion, I beg leave to offer my best thanks to Prof. Smith for his courteous remarks.

Explanation of the Figures.

Fig. 1.—Sketch of Mr. Scudder's fig. 42 (pl. 46), representing the "androconia of *Laertias philenor*;" this object is shown upside down; its asymmetry is probably due to pressure.

Fig. 2.—Basal portion (for comparison with the above) of the *Pieris agathina* fungus; *st.* stem; *p.* paraphyses.

Fig. 3.—The *P. agathina* fungus, from which the entire stem has fallen out.

Fig. 4.—Fungus of *P. agathina*; *pe.* peridium; *p.* paraphyses; *b.* border or coping; *r.* rod-like structures on upper part of peridium; *st.* stem, extending the whole length of the peridium; *sp.* sporocarp; *s.* black spot on the apex.

NOTES ON THE BUTTERFLIES OF SICILY.

By Margaret E. Fountaine.

Having had some idea of spending the summer in Sicily, with a view to collecting butterflies when I heard that I should probably be the first English lepidopterist who had ever visited the island, and also that a certain amount of danger might be incurred thereby from brigands, &c., any hesitation I might previously have had, before making up my mind, was quite at an end; I decided to go.

It was about 4 a.m., and a glorious summer morning, on the 10th of May last, when I first beheld the mountains round

Palermo, through a port-hole of the 'Cristofero Colombo,' and thought, as I looked out, of all the little sleeping insects dispersed over those mountains, as yet innocent of the hand of the spoiler. But as I particularly desired to obtain specimens of the genus *Melanargia*, for which I knew Sicily was most famous, and being aware of their local habits, before commencing to work the neighbourhood I thought I might as well allow my head to save my heels; so, having discovered that Signor Enrico Ragusa, whose writings on the entomology of Sicily I had been reading with much interest during the winter months in England, was no other than the proprietor of the Grand Hôtel des Palmes, I lost no time in repairing thither. His reply to my question as to the best locality for *M. pherusa* was, "You'll have to look sharp; the time to take fresh specimens of the *pherusa* is generally the end of April or quite the beginning of May!" adding, however, that as this was a late season I might find it at the foot of Monte Cuccio, distant about four or five miles from Palermo.

The next day I was there; but it seemed a long walk from Bocco di Falco, and I had begun to despair, more especially as "il tempo faceva un po' brutto!" and the sunshine was becoming more and more dim every minute. At last, when I had ascended a short distance up from the foot of the highest peak of Monte Cuccio, I suddenly saw, blown by the wind, one solitary specimen of the butterfly for which I was on the look-out. There was no mistaking it, and, in spite of the unpropitious foothold on the sloping sides of the mountain, covered with loose stones, I at once gave chase, trembling with excitement, and slipping and falling more than once. But the *pherusa* was fast getting the best of it; flying with the wind, it seemed to have no intention of settling, or of doubling in its rapid flight. My heart sank within me, when, lo! there was another, and yet another! I then found that this wanderer, though itself now quite lost to sight, had guided me to the spot where several of its companions soon fell an easy prey to my net. In spite of the strong wind and the misty sunshine, they were out on the wing, and not at all difficult to take, as they had a great predilection for settling on a kind of dwarf thistle, which grew there in some abundance.

After three days' collecting, between the dates of May 12th and 18th, inclusive, I had succeeded in taking over sixty specimens, nearly all in perfect condition, but out of which only thirteen were females; and six males and one female distinctly belonging to the variety *plesaura*, though several other male specimens approached it very nearly.

I scarcely ever saw this butterfly other than in this one locality, where it was extremely plentiful. And though the walk from Bocco di Falco to San Martino was perhaps more beautiful than anything I had ever seen, with the hedges on either side of the road for miles far out into the country of garden roses covered with bloom, at the roots of which *Convolvulus major* and sweet pea grew in extravagant luxuriance; and though the meadows were golden with orange marigolds, in this perfect wilderness of flowers butterflies of all kinds were conspicuous by their absence; indeed, I scarcely saw any, except one fine male specimen of *Lycæna cyllarus*, and a few *Euchloë belia* var. *ausonia*, or rather what appeared to me more nearly to approach the var. *simplonia*, being identical with some specimens belonging to that variety I had taken on the Becca di Nonna, near Aosta, about this time last year.

At Morreale I found a stream where *E. cardamines* var. *turritis* was common, but many of the specimens were rather worn. It is supposed to be entirely represented by this variety throughout Sicily, but I must confess my inability to see that it differed very materially from the type.

Before I left Palermo Signor Ragusa kindly gave me some information respecting other Sicilian species, notably those of the genus *Melanargia*. *M. arge*, he stated, did not occur at all in Sicily, but seemed to represent *pherusa* on the mainland, *i. e.*, the mountains in Calabria, occurring about the same time. *M. japygia* and the var. *cleanthe*, he said I would find common in several localities during the months of June and July.

After having paid a hurried visit to Girgenti, to see the ruined temples, the next place in which I found myself was Syracuse; but windy weather made it most unfavourable for collecting.

I have since heard that a local variety of *M. galatea* occurs about five miles from Syracuse, and I am fully persuaded that it was my luck to *see* this butterfly on the wing, at a place called Euryelos (about five miles inland). It was flying over about the most inaccessible ground I have ever yet encountered. I only saw from three to four specimens, always on the wing; moreover, I was not alone that morning, but limited to the time Herr Güterbock was pleased to occupy in looking at some old Grecian remains in the immediate vicinity, and, to make a long story short, I did not succeed in netting one single specimen; thinking also that it was only the typical *galatea*, and,indeed, had I known otherwise, I fear Herr Güterbock would have been obliged to find a more prolonged interest in his Grecian remains.

After five days at Syracuse, I next visited Taormina, where I had some idea of settling for the summer. For, that so beautiful a spot could fail to produce good collecting-ground seemed to me impossible; my experience having ever led me to seek for these insects of light and sunshine in haunts the most beautiful and attractive, from the stern grandeur of the high Alps of Switzerland to the sunny, flowery valleys of the Riviera.

It was now early in June, but every expedition I made was, from an entomological point of view, always more or less a disappointing one. It was too early to attempt to make the ascent of Mount Ætna, as it was still covered with snow, and always enveloped with clouds even on the brightest days. Had I stopped at Catania I might have visited some of the less elevated parts of that wonderful mountain (said to measure ninety miles round the base), but from Taormina it was not very accessible even to do that. So I gave it up.

On the rocks above the station of Giardino-Taormina I found *S. semele* var. *aristæus* freshly emerged and in perfect condition. This insect in Sicily seems to differ slightly from the Corsican form; it is decidedly larger, but the fulvous colouring on the upper side of both wings is rather less broadly suffused. I also found here *H. nostrodamus* and *H. actæon*, the latter quite common; and a few other butterflies of little importance.

But as I only spent one week at Taormina, I should not condemn the locality so much from my own experience, as from the fact, that on one occasion an entomologist (I think a German) had taken a house in the neighbourhood, but found so little of interest in his entomological researches that he gave up his house and went away elsewhere. So I too followed his example, and moved on to Messina, where, through a letter of introduction I had to Signor Polimeni, I became acquainted with two local naturalists, Signor Vitale (a coleopterist) and Signor Eugenio Amenta, both of whom knew the neighbourhood well. And as the latter accompanied me in nearly all my expeditions, I wasted no time here in trying unproductive localities.

At first we nearly always went to Gravitelli, not a mile out of the town, but on the low arbutus-covered hills we generally did some "good business." *M. didyma* var. *meridionalis* was now on the wing, the female of which was very large and handsome, the ground colour of the fore wings being entirely suffused with olive green, and on the hind wings the black markings were often exceedingly broad, in some specimens extending over quite two-thirds of the surface. The male was, perhaps, rather brighter fulvous than the type, with the black markings more scanty. *C. jasius*, which does not occur in the west of the island, was quite common on the arbutus slopes of Gravitelli. There was also a remarkably fine form of *V. polychloros*. M. Bellier, speaking of this species, says:—"La *polychloros* di Sicilia e bellissima!" And in this he said truly. *V. cardui* was very abundant. Signor Amenta stated that on one occasion he had seen a perfect invasion of this insect, blown over from Africa, but they did not remain in the district, and in two days had all passed over and gone elsewhere.

But I was still anxious above all things to obtain the remaining species of *Melanargia*, and having heard that *M. arge* had been seen and taken in this neighbourhood, imagined that it was just possible Signor Ragusa (who had admitted that he knew little or nothing of the Messina district) might have been mistaken in his assertion that it only occurred on the mainland, especially as the Straits are so narrow that it seemed more than probable that it might also inhabit the immediate neighbourhood of Messina; but as I never received an altogether satisfactory account of its capture, or saw one of the specimens said to have been taken, I am inclined to think that Signor Ragusa's statement was quite correct. In fact, almost the only *Melanargia* I saw here was *M. galatea*, a very large and dark form, some specimens decidedly belonging to the var. *procida*, while most of them nearly approached it. I believe in some seasons *M. japygia* and the var. *cleanthe* would occur here; but this was a bad one, and all I succeeded in getting of this butterfly was one specimen of the var. *cleanthe*, taken by Signor Amenta at Gravitelli, and another (much damaged), on the summit of Monte Ciccia.

The latter locality, about two hours' walk from Messina, was well worth several visits; on the south-eastern slopes of the mountain, where the orange marigolds grew to a great height, and in some profusion, beneath the meagre shade of a forest of umbrella pine trees, *A. pandora* were literally tumbling over each other, so plentifully was that glorious butterfly represented, male and female alike common, and all fresh out towards the end of June. It was here too that we found *A. niobe*, var. *eris*, hitherto not included amongst the butterflies of Sicily; it was a fine form, and the specimens differed slightly from those of Switzerland, the under side of the hind wing in the male being more suffused with green, and the broad submarginal band on the same wing in the female being so dark, that in many specimens the markings were almost black, and always very broad and distinct. *S. semele* var. *aristæus* was very common on Monte Ciccia; also *C. edusa*, the var. *helice* occurring not unfrequently with the type; we took several specimens of it, and I had also caught one at Syracuse; possibly the absence of *C. hyale* from the island, thereby enabling one to know that every light-coloured *Colias* must necessarily belong to this variety, had something to do with it. There was also in Sicily another slight variety of *C. edusa*, described by Signor Ragusa, and called var. *minor* on account of its exceedingly diminutive size; I took one male specimen (measuring only 1·25) during a few days I spent again at Palermo in June. The weather was windy, and I was again disappointed in my hope to find *M. japygia*; indeed I took little of any importance, except, perhaps, some very fine specimens of *C. pamphilus*, var. *lyllus*; and I was glad to return to Messina, as, so far as my superficial experience goes, I certainly consider that district to be the most productive of any I have visited in Sicily. I much regretted not being able to explore the Madonie mountains, where, doubtless, I would have found many other species, though no *erebia* has as yet been seen in Sicily; but as I heard the hotel accommodation was exceedingly bad, or more likely none at all, and as I was alone, I fear I was not sufficiently enterprising to attempt it, more especially as I heard it was not improbable that in a year or two there might be a good mountain hotel at Castelbuono. And now it but remains for me to add, that throughout the two months I spent in Sicily I met with nothing but courtesy and hospitality from all the inhabitants of the island, rich and poor alike; and those who fear to visit a country so exceedingly interesting and intensely beautiful may take my word for it that "il n'y a pas de quoi!"

All the butterflies observed by me in Sicily were:—

P. podalirius, L. Fairly common everywhere; the ground colour on all the wings in most specimens paler and more washed out, The var. *zancleus*, Z., in which the body in both sexes is white, does not appear till August, so that I did not see it, except in Signor Ragusa's collection.—*P. machaon*, L. Generally distributed, but rather less common than the preceding. It is said that the *machaon* of Sicily belongs exclusively to the ab. *sphyrus*, Hüb., but I did not see more thun a specimen here and there that seemed to me to differ in colour from the typical continental form.

A. cratægi, L. Fairly common round Palermo in June.

P. brassicæ, L. Common everywhere.—*P. rapæ*, L. An exceedingly diminutive form of this species occurs in Sicily, with the type; I took a male specimen at Taormina in June measuring only 1·21.—*P. daplidice*. Common everywhere. I took a female specimen at Taormina with an exceedingly diminutive pink mark next the outer margin of hind wings, appearing on either side, but more distinct above.

E. belia var. *ausonia*, Hüb. Common at Palermo, Syracuse, &c., in May; some of the specimens were very small, and some seemed to me more like *simplonia*, Frr. than *ausonia*.—*E. cardamines* var. *turritis*, O. At Palermo, in the middle of May, rather worn; very much so, later, at Taormina and Messina.

C. edusa, F. Common everywhere.—Var. *minor* (Ragusa). An exceedingly diminutive form, rather paler than the type, seemed common on Monte Pellegrino, near Palermo, in May. I took a male specimen measuring 1·25, at San Martino, in June. Of the var. *helice*, Hüb., one specimen at Syracuse in May; several near Messina in June.

G. rhamni, L. Fairly distributed.—*G. cleopatra*, L. Common at Taormina in June, but I only remember once seeing one at Messina; all the rest belonged to the preceding species, which at Taormina I did not observe at all.

T. acaciæ, F. Fairly common at Gravitelli, near Messina, in June.

P. phlæas var. *eleus*, F. Examples of the second brood seemed generally to belong to this variety, but in the spring I could not find any that were not typical.

L. bœtica, L. Two specimens, male and female, taken near

Messina in June.—*L. telicanus*, Lang. Seen rarely, near Messina, in June.—*L. baton*, Berg. A few damaged specimens at Messina in June and July.—*L. astrarche*, Bgst. Common.—*L. icarus*, Rott. Very common in every locality.—*L. bellargus*, Rott. Not at all common.—*L. argiolus*, L. I saw a good many specimens of this butterfly, all females, near Messina, in June and July.—*L. semiargus*, Rott. One male example at Zafferia, near Messina, in June.—*L. cyllarus*, Rott. One male on the road to San Martino in May.

Libythea celtis, L. One very damaged specimen seen at Taormina in June.

C. jasius, L. Common at Gravitelli, near Messina, in June.

L. camilla, S.V. Not unfrequent in the neighbourhood of Messina in June and July.

V. egea, Cr. At Messina in June.—*V. c-album*, L. At Taormina and Messina, in June.—*V. polychloros*, L. A remarkably fine form near Messina in June.—*V. urticæ* var. *ichnusa* (?), Bon. Said to have been taken in the Madonie Mountains; all the specimens I saw were typical, and in no way resembling the *ichnusa* of Corsica.—*V. atalanta*, L. Common throughout the summer months.—*V. cardui*, L. Very abundant round Messina in June and July. Some of the examples were very small and washed out; others especially large and deeply coloured.

M. cinxia, L. Not very common. I took one very dark female specimen at Taormina, the rest I had observed being identical with those of North Italy, &c.—*M. didyma* var. *meridionalis*, Stgr. This butterfly is entirely represented by this variety throughout Sicily. I took several specimens at Messina in June and July.—*M. athalia*, Rott. Fairly common near Messina in June and July.

A. latonia, L. Occurring somewhat sparingly in various localities. —*A. niobe* var. *eris*, Meig. Very common on Monte Ciccia in June and beginning of July.—*A. pandora*, S.V. Exceedingly abundant on Monte Ciccia in June and July.

M. galatea, L. A very large, dark form, some of which were of the var. *procida*, Hbst., occurred at Messina in June; specimens taken near Palermo in the same month were much lighter.—*M. japygia* var. *cleanthe*, B. Two male specimens near Messina; one taken at Gravitelli, and one (damaged) on the summit of Monte Ciccia; both in June.—*M. pherusa*, B. Very common on one special spot at the foot of Monte Cuccio, near Palermo, in May. One worn female taken at San Martino in June; the var. *plesaura*, Bell, occurring with the type, but not more than about one in ten.

S. circe, F. Occasionally seen on the wing on Monte Ciccia.—*S. semele* var. *aristæus*, Bon. Exceedingly abundant in rocky, stony places in June and July.—*S. statilinus* var. *allionia*, F. I took one fresh male specimen at Cirpi, near Messina, in July. Signor Amenta said that a week or two later this butterfly would appear in great abundance in this and other localities.

P. megæra, L. I saw many typical specimens of this butterfly, but none seemed at all to approach the var. *tigelius* of Corsica.—*P. egeria*, L. Fairly distributed.

E. ianira var. *hispulla*, Hüb. Common everywhere. Signor Amenta took a male specimen on Monte Ciccia on which the right lower wing was very much diffused with white; several of the specimens in that locality, though fresh out, were rather pale and washed out, especially on the under side of hind wings.—*E. ida*, Esp. At Taormina, Messina, and Palermo, in June.

C. pamphilus var. *lyllus*, Boisd. This variety occurs in the summer brood. I found it between Bocco di Falco and La Rocca, near Palermo, in June; though after 5 p.m., and a stormy evening, with the sirocco blowing, it was still on the wing and in perfect condition.

S. alceæ, Esq. I took two male specimens at Syracuse in May, and had observed it also at Palermo.—*S. altheæ*, Hüb. I took one male specimen at Palermo in May, and observed others.

H. thaumas, Hufn. One male specimen at Taormina in June.—*H. actæon*, Esp. Common at Taormina, Messina, and Palermo in June; female rare.—*H. nostrodamus*, F. Not very common at Taormina and Messina in June.

Bath, November, 1896.

THE SENSES OF INSECTS.

By G. W. Smith.

May I express some of my views on this subject in connection with the interesting papers of Mr. Arkle and others that have appeared from time to time in the 'Entomologist'?

It has struck me in the first place that if Mr. Arkle had discovered organs of hearing in insects he would have achieved a great anatomical success; but since he has not done so, I do not think we should accept his failure as a proof of their non-existence, granted even that his search has been exhaustive. The anatomical search has been made thoroughly for actual organs of hearing, and naturally or unnaturally enough the search has not been successful. But this does not lessen the importance of a large body of facts which have been adduced from quite a different point of view.

Romanes justly remarks,* that we have no actual (anatomical here) evidence of objective intelligence in the world; but his next statement is as just, namely, that we may presume the presence of that quality in an organism that responds to a certain stimulus in an original and uninstinctive manner.

And to take a different case: when a dog growls, in most cases it is not rash to presume that the dog is angry; and when a cat purrs, we may safely deduce that the cat is pleased, although the terms are comparative.

The facts that are to be collected, therefore, with regard to the senses of insects, must take this form rather than the form of evidence obtained from the dissecting table. Now the facts to which I refer have been conveniently compiled in the second

* 'Introduction to Animal Intelligence' (Science Series).

part of Darwin's book on the 'Descent of Man' (pp. 280–300, 2nd edit., 1894).

There is no need to accept the hypothesis of sexual selection for our purpose, since the observations of several naturalists, including Dr. Hartman, Fritz Müller, Dr. Scudder, Mr. Bates, and Mr. Marshall (Entom. xxix. 42), coincide to prove that the females of certain insects, notably the Cicadas, are actually brought together by the stridulations of the males.

Of course it would be more conclusive if we could actually find these organs of hearing that must be present to the females; but the failure of anatomy in this direction is not sufficiently important to obliterate any just conclusions we have previously gained from the deductive point of view.

With relation to the stridulating organs of insects a word may not be out of place. Among the Diptera, the Reduvidæ, the Homoptera, the Orthoptera, with the Locustidæ, and certain Coleoptera, possess this power of stridulating; and it is a noteworthy fact that these organs must have been exclusively modified to their present pitch of perfection by natural selection for the sole purpose of stridulation; (though in this last statement Mr. Arkle can use my own arguments with some effect against me).

Mr. Arkle, no doubt, justly complains of the senses of touch and hearing being confounded, but this hardly influences the subject from a general point of view. Sir John Lubbock points out that several supposititious, animal instincts and senses would imply no meaning to us at all, since their parallels are not experienced subjectively; but in our present state of knowledge it will be less awkward to employ the term "hearing" where "sound" is concerned.

College, Winchester, Dec. 4th, 1896.

DESCRIPTIVE NOTES ON TWO COCCIDÆ.

By T. D. A. Cockerell.

(1.) Lecaniodiaspis celtidis, Ckll., Psyche Suppt. p. 19.

At the place cited are only a few lines of preliminary description; the full details are herewith given for the first time.

♀. Length 3, breadth 2½, height 1½ mm., broad-oval, convex, above very light ochreous, conspicuously frosted with white secretion. Under side pale orange-yellow; forming a complete ventral scale, but of thin papery texture. Contents of body dark crimson. Eggs pale pink. Antennæ pale brown, 8-jointed; joints 3, 4, and 5 longest and subequal, 4 a little the longer and about as broad as long; 6 a little shorter than 5, and about as broad as long; 7 shorter than 6; 8 shortest, with several hairs; 2 much broader than long, equal in length to 7; 1 very broad, about as long as 6. Formula 4 (35) (61) (72) 8. Total length of antennæ about the same as width of mouth-parts. Mouth-parts brownish, large and well developed. Derm colourless after boiling, thickly beset with double glands and rod-like structures. Anal area with a brown chitinous armature, consisting of an upper portion shaped like a slug's jaw, and a broad transversely elongate lower portion, with apparently a large central aperture, but really consisting of two large lateral plates, connected by a strong isthmus. Anal ring moniliform, with several hairs.

On *Celtis occidentalis*, San Antonio, Texas, Nov. 27th, 1895 (C. H. T. Townsend). Recently, Prof. E. E. Bogue has found a *Lecaniodiaspis* in Oklahoma, which is like the above, but a little larger. I have not yet made a detailed study of it, but have no doubt it is the same species.

(2.) PULVINARIA INNUMERABILIS, Rathv., variety?

♀. Dark brown, when boiled and flattened under cover-glass, 6½ mm. long, 5½ broad. Antennæ long, slender, pale brown, joint 3 longest; 2, 4, and 5 subequal in length, 8 a little shorter; 6 and 7 equal and shortest. Formula 3 (245) 81 (67). 2 and 5 each with two hairs near the end. There is quite a constriction at the suture between 7 and 8. Legs pale brown, slender; coxa large, trochanter with a long hair, femur about as long as tibia, tarsus about half as long as tibia. Digitules of claw fairly stout, with large knobs, that of one round, of the other oval; both extend considerably beyond tip of claw. Tarsal digitules unequal, one not much longer than those of claw, with the terminal half bulbous, the other longer and slender, with an obliquely placed knob. Derm with large round and oval gland pits. Stigmatal spines in threes, one very long, two short. Margin with small simple sharp spines, in two rows, not near to each other.

The above description relates to the *Pulvinaria* which Prof. C. V. Piper finds "so common a pest in Western Washington [State];" found on currant, hawthorn, plum, pear, mountain ash, willow, poplar, gooseberry, and alder. Prof. Piper remarks: "Of one thing I am certain; it is not native to Western Washington." Formerly Prof. Piper referred it to *P. innumerabilis*, but was criticised for so doing, more especially as its food-habits seem different from those of that species. The question was raised, whether it might be the European *P. ribesiæ*, introduced; but that is a much smaller insect. On the whole, it must be confessed that it is at any rate not very different from *P. innumerabilis;* and since we have no adequate information about the variation of that insect, it seems premature to separate the Washington species as distinct. I will suggest, therefore, that provisionally we call Prof. Piper's insect, above described, *P. innumerabilis* var. *occidentalis*. The ovisac resembles that of *innumerabilis*.

While writing on Coccidæ, I may as well put the following items on record :—

Kermes gillettei, Ckll. I found this last year on oak at Monument Rock, Santa Fé Cañon, New Mexico, 8000 ft. altitude. New to New Mexico, and the highest record for any *Kermes.*

Lecanium (*Bernardia*) sp. On fruit of *Cereus triangularis*, Jamaica (W. Harris). Mentioned on account of the unusual food-plant. The specimen arrived in fragments, and could not be determined.

Aspidiotus ficus, Ashm. Many on both sides of leaves of *Cœlogyne cristata* in greenhouse at Ottawa, Canada. Sent by Mr. J. Fletcher.

A. coloratus, Ckll. Described as a variety of *A. uvæ*, but doubtless a distinct species. I found it lately in abundance at Rincon, New Mexico, on *Chilopsis.* At Las Cruces I noted, on a badly-infested *Chilopsis*, numbers of predatory coccinellids of the genus *Chilocorus ;* these Mr. Wickham, to whom I sent specimens, identified as *C. cacti* and *C. bivulnerus.* The *Chilopsis* in question was the one that yielded the original types of *A. coloratus.*

Icerya rileyi, Ckll. Hitherto this has only been known from Las Cruces. On July 10th I found it on mesquite at Colorado, New Mexico. Colorado is the name of a small village, and has nothing to do with the State of that name.

Mesilla, New Mexico, U.S.A., Aug. 29th, 1896.

NOTES AND OBSERVATIONS.

High-Flat Setting.—The numerous writings and opinions of correspondents in late numbers of the 'Entomologist' on the most important question, "Are we to adopt the continental mode of setting?" must have intensely interested and aroused all whose feelings are at all keen on this subject. Surely there is no need to go to this the farthest of far extremes? I indeed hope not. Looking at Mr. Dannatt's note (Entom. xxix. 330), I am of one mind with his remark that perfectly flat-set insects have the effect of producing an objectionably wooden appearance, and thus become ungainly and stiff to most eyes, excluding, of course, continental collectors, who are prone to think otherwise. I cannot, however, agree with another remark of Mr. Dannatt's—that flat setting is contrary to the laws of nature ; indeed, I am inclined to consider our own setting more averse to these laws, seeing that the costa of most, and I fancy of all, Lepidoptera is constituted in a rigidly straight plane, in the living state. On our rounded boards the costa becomes curved in accordance with the curvature of the setting board, which produces an utterly unnatural attitude. In fact, many held that the much-rounded insect is as objectionable, or more so, than the flat-set one. Being one of those who wish to bring the wings of their specimens more level, I have always found that by setting the insect on a board one or two sizes above that of its own, an entirely satisfactory and inoffensive elevation is attained without going to the extreme of using the foreign board. I can only conclude these simple suggestions with the sincere hope that unadulterated continental setting may never come to be *à la mode* in England.—C. J. Nash; Pitnacree, Culver Road, Reading, Dec. 9th, 1896.

Entomologist *v.* Collector.—It will probably be considered by the editor, and by the unhappy "collector," if by no one else, to be about time that this discussion ceased. As I initiated it, and seem to have been elevated into a kind of champion of the class, I may, perhaps, be allowed a few words before the matter drops. It does not seem to me that anything of much value has been elicited, beyond the courteous and considerate tone which, with one exception, has marked the correspondence; but still one point appears to come out pretty clearly, namely, that collectors themselves may be divided into two classes, or, as the anti-collector would probably put it, that beyond the lowest depths there is a lower depth still. In the first class would be placed those who, while not trying to obtain scientific rank, yet do, through their collecting, gain some knowledge of general principles. In the second class would come those, probably not many, who regard their collection simply as an aggregation of specimens, and have no intention beyond the desire of making it as complete as possible. Well, no doubt the whole question was more a matter of sentiment than of practical significance from the first, but still there is satisfaction in knowing how one stands, and so I submit that the position may be exhibited in a tabular form thus:—

I.—Entomologist ……	Studies scientifically from the outset.
II.—Sub-Entomologist	Collection his first object, but gains some scientific knowledge in the process.
III.—Collector ………	Has no object beyond amassing specimens.

Now I maintain that all these classes are interdependent, and form parts of one great whole, and that no one of them has the right to express or feel contempt for the others, but that all may and should work harmoniously together.—Rev. W. Claxton; Sunnyside, Woolston, Southampton.

[This discussion is now closed.—Ed.]

The Geographical Varieties of Parnassius apollo.—Mr. Elwes (Entom. xxix. 356) does not coincide with my suggestion that the geographical varieties of the above-named species are worthy of distinctive cognomens. At the same time he does not furnish any clear argument in support of his objection. Although I consider paltry aberrations—such, for instance, as the slightly deviating form of *Lycæna icarus*, known as *icarinus* unworthy of a special name, well marked geographical varieties (such as those I have defined of *P. apollo*), as well as seasonally dimorphic forms, are surely of sufficiently elevated rank. If they were mammals, they would, indeed, according to the modern tendency of zoologists, most likely be made to rank as species. Witness, for instance, the recent re-classification of the North American *Ursidæ* (cf. 'American Naturalist,' 1896). Mr. Elwes's ideas are, as is well known, in the opposite direction; and I should be glad if he would state his views on the subject, as to what degrees of variation, in his opinion, are worthy of the dignity of distinct names, and which are not. In my humble opinion the geographical varieties of *P. apollo*, which I have described, are of more importance in their relation to the type than the forms of many other species of European Rhopalocera I could name which have already received distinctive recognition. Until I can be convinced to the contrary I shall continue to pursue the orthodox course.—W. Harcourt-Bath, Birmingham, Dec. 8th, 1896.

The Synonymy of Polygonia c-album var. hutchinsoni. — As a great deal of controversy has been going on regarding the var. *hutchinsoni* of *P. c-album*, it may be useful to see the synonymy. Robson ('Young Naturalist,' ii. p. 110) gives the name *hutchinsoni* to the pale form occurring in the summer brood. Harcourt-Bath ('Entomologist,' xxix., 1866, p. 257) proposes the name *lutescens* for the same form, and states that it is the typical form of the continental first brood, but only occurs as an occasional aberration in this country. Tutt ('British Butterflies,' p. 344, 1896) says that there are two distinct forms in the ground colour, one decidedly with more orange in the red. . . . . The paler form appears to be common in the summer brood (June and July), although it occurs in the autumnal one. This he calls ab. *pallida*. The synonymy would therefore read—

Polygonia, Hb.
  c-album, Linn.
    var. *hutchinsonii*, Robson, Young Nat., ii. p. 110.
      =*lutescens*, H. Bath., Entom., 1896, xxix. p. 257.
      =*pallida*, ab., Tutt, Brit. Butt., 1896, p. 344.

I hope in a succeeding paper to correct other synonyms, which recent authors have disregarded, owing to the fact that they have not made themselves thoroughly acquainted with all the previously described varieties and aberrations.—John W. Shipp.

[As the priority of the name *hutchinsoni* for the form in question has been clearly established, there does not appear to be any necessity to further discuss the matter.—Ed.]

Gonepteryx rhamni in Ireland.—The reported successful introduction of *Gonepteryx rhamni* into some locality in the Co. Tipperary by Mr. Purefoy is extremely interesting (Entom. xxix. 363). Colonel Cooper, of Markree Castle, Co. Sligo, contemplated, some years ago, a similar experiment, and was planting buckthorn for that purpose, but I am not aware whether he has carried out his intention. It seems, however, passing strange that Mr. Purefoy should have proceeded so recklessly as not to ascertain whether either the food-plant or the insect was indigenous, as he might know the serious injury that might be done to science by tampering with the distributional conditions of our fauna recklessly. His publication of the fact, however, will prevent Tipperary being accidentally included as one of the natural habitats of *G. rhamni*. It is to be hoped that he will further complete his notification by distinctly indicating the locality of this colonisation. It is astonishing to hear that he has not been able to learn whether any species of *Rhamnus* is native in Ireland, while it is abundantly and widely spread over the adjoining territories of Galway and Connemara, together with the butterfly in question, and reaches southward through Clare to Kerry, northward to Longford and Cavan, where I saw a fine tree of *R. catharticus* myself this summer on the shore of L. Oughter. A reference to 'Cybele Hibernica,' which I have not at hand to refer to, will reveal, doubtless, a wider distribution. But it is more bewildering to read his supercilious treatment of the records of competent authorities as to the existence of *G. rhamni* in Ireland! "It has been reported from Killarney, but it is more than doubtful"! I trust he will not consider it as impertinent if I say that unless he accompanied his MS. with specimens of the butterflies he has introduced, I do not think his *ipse dixit* will carry more conviction than the records of the veteran entomologist Birchall, and myself; or than the testimony of the Hon. Miss Lawless, Mr. Ussher of Cappagh, Mr. Neale (the Secretary of the Limerick Naturalists' Field Club), or others who have published their captures from time to time, and have reported its abundance in the neighbouring county of Galway, and its existence in several others, which records were embodied in my notice of the insect in the Catalogue of Irish Lepidoptera (Entom. xxvi. 120).—W. F. de V. Kane; Drumreaske House, Monaghan.

Mr. E. D. Purefoy is not accurate in stating that *Gonepteryx rhamni* does not occur in Ireland; nor is he right in saying that neither kind of buckthorn grew in this country. If he will turn to the 'Cybele Hibernica,' he will find that *Rhamnus catharticus* is found in seven out of the twelve botanical divisions of Ireland, and *R. frangula* in five of those divisions; and if he refers to Entom. xxvi. 120, he will find Mr. Kane's report of the butterfly's occurrence in Kerry, various parts of Galway, and in Longford. Last year Miss Bewley took it in the Queen's County ('Irish Naturalist,' vol. viii. p. 87), but possibly her specimens may have strayed from Mr. Purefoy's domains. Mr. Purefoy is, however, to be congratulated on his very successful attempt to establish this pretty insect among us; for, though not altogether a stranger, its appearances have been too few and far between.—George E. Hart; 14, Lower Pembroke Street, Dublin, Dec. 5th, 1896.

Is Thalpochares (Micra) Paula, Hübn., a British Species?—In the recent sale of Mr. Briggs' collection was a specimen named as above. It is certainly very different to any foreign specimens of *T. paula* which I have seen. It far more resembles foreign specimens of *T. parva*, the sexes of which are by no means alike. In the sale catalogue reference was made to the Ent. Mo. Mag., vol. ix. p. 19, where, in the description of *T. paula*, the second fascia is stated to be a mere brown line, once angulated, and before it is a crescent-shaped upright white streak on the inner margin, occasionally becoming a fascia, and reaching the costa. "*Micra*" *parva* is stated to have both the fasciæ straight and oblique. Now, as I understand from Meyrick's Handbook, it is *T. paula* which has both the fasciæ straight and oblique, and *T. parva* which has the second fascia crooked. The larva, too, of *T. paula* feeds on *Gnaphalium arenarium*, which is not a British plant. As it is more than twenty years since Mr. Barrett wrote the article in the E. M. M., perhaps he will kindly give us his opinion afresh.—C. W. DALE; Glanvilles Wootton, Dec. 4th, 1896.

COMMITTEE OF THE ENTOMOLOGICAL SOCIETY OF LONDON FOR THE PROTECTION OF LEPIDOPTERA.—At a meeting held on November 25th, it was resolved to invite the co-operation of local Societies throughout the United Kingdom, and to ask them to furnish information as to proceedings likely to cause the extermination of local species of Lepidoptera. Communications will be received by the Hon. Secretary, CHAS. G. BARRETT, 39, Linden Grove, Nunhead.

CAPTURES AND FIELD REPORTS.

ACHERONTIA ATROPOS IN 1896.—I took a fine larva of *A. atropos* last August in New Barnet, ten miles from London.—H. C. REGNART; Clinthill, Park Road, New Barnet.

VARIETY OF VANESSA ATALANTA.—The variety of *V. atalanta*, referred to Entom. xxix. 371, appears to be similar to the aberration of the species recorded by me, Entom. xxiv. 31.—J. HY. FOWLER; Poulner, Ringwood, Dec. 5th, 1896.

ANOSIA MENIPPE, Hübn. (D. ERIPPUS, Cr.)—After seeing the note, *ante*, p. 365, it seemed only right that I should report the following:—On July 12th last, at Newland's Corner, Surrey, a young friend who was out with me collecting saw at rest on the trunk of an oak a well-marked specimen of *Anosia menippe*, Hübn. In his haste to make a capture he made a mis-stroke, and the insect escaped. As he knew the insect, and there is no doubt as to his *bona fides*, it seems that Surrey may fairly be credited with having been favoured last summer with the presence of a specimen of this grand butterfly.—W. J. LUCAS; Knight's Park, Kingston-on-Thames.

HYBERNIA AURANTIARIA AND DEFOLIARIA IN MID-LONDON.—On Nov. 20th last at mid-day I captured a specimen of *Hybernia aurantiaria* in good condition at rest outside a ground-floor window on the street in Chancery Lane. The next day, Nov. 21st, on the flag-stones between the gates of the British Museum and the building itself I found a specimen of *H. defoliaria*. It had been trodden upon by some passer-by, but the upper wings were sufficiently perfect to show that the insect had been in good condition.—SELWYN IMAGE; 6, Southampton Street, Bloomsbury, W.C.

FURTHER NOTES ON CALLIMORPHA HERA.—To my remarks on this species in the 'Entomologist' for 1895 (vol. xxviii. p. 290), I should like to add the following:—Seventy-seven out of some hundred and twelve larvæ of *C. hera* successfully hybernated on ground ivy, and fed up rapidly on white dead-nettle; three were lost by drowning (these I had preserved); whilst some two or three specimens died when full-fed. Most of the rest spun a slight cocoon between the moss at the top of the pot and the soil, none pupating underground. Six or seven spun together two or three leaves of the nettle, and then turned into the chrysalis state. I reared in all forty-nine beautiful specimens and nine cripples, the latter I believe caused by my having kept the pupæ too dry. Most of the imagines emerged between 2 and 4 p.m. indoors. The first emerged on June 30th, and the last July 19th. Of the forty-nine specimens reared, twenty-six were males and twenty-three females: nineteen males and seven females had red hind wings; seven males and ten females had orange hind wings; and six females had yellow hind wings, Let me strongly advise those who have larvæ this year not to feed them on dandelion or groundsel.—William Hewett; Howard Street, York.

Notes on the Macro-Lepidoptera of the Conway Valley, North Wales.—The cliff-like line of hills which form the boundary of the Vale of Conway on the west side is broken at intervals by various valleys and glens, down which rush the tributary rivers and streams from the lakes and pools of Eastern Snowdonia. In most of these insect life seems more abundant than in the wider strath of Conway itself, which I attribute to their freedom from the floods which occasionally submerge the low-lying Conway vale; and as I was living at the bottom of one of the most picturesque of these little valleys the greater part of last spring and summer in order to fish the Conway, and the Cwlyd and Crafnaat lakes, I made the following notes on some of the Lepidoptera that I met with during walks and hours not devoted to angling. The glen in question, though only about two miles in length from where the stream rises out of one of the larger lakes to where it rushes down by a series of cascades into the Conway, presents a diversity of physical features, as the water runs from a mountainous and moorland region at the top of the valley through thickly-wooded dells of fir, oak, birch, and alder, into the meadow-land at the bottom; and this would naturally be favourable to a variety of lepidopterous insects, as the altitude varies also from 600 feet at the lake, with the hills on either side rising to 1000 feet, to nearly sea-level at the tidal reach where the stream joins the Conway. Among the Rhopalocera I found *Pieris rapæ* and *P. napi* both abundant; but I did not observe many *P. brassicæ* until late in the season, when they became very numerous. On July 31st a small meadow of uncut grass and wild flowers was full of them, mostly at rest on the flowers.—*Euchloë cardamines* was abundant.—*Argynnis euphrosyne* more or less common all over the central and woody portion of the glen; but as long as they were "out" they were always collected in vast numbers in a little glade covered with small furze and alder bushes, where I could obtain any quantity without moving from one spot; here on May 8th they literally swarmed.—*A. selene*, common, but nothing like the numbers of the preceding species.—*Vanessa io*, hybernated specimens very plentiful in the spring, and most of them in excellent preservation. I did not see many of them in the autumn; but the continuous rainfall would account for that, as it did for the scarcity of *V. atalanta*, of which I only saw two.—*V. urticæ*, common.—*V. c-album*, plentiful, especially hybernated specimens; but I took five splendid ones in two adjoining meadows on Sunday, August 2nd. The rich velvety gloss of the black spots on the wings seem to fade soon after death.—*Pararge egeria*, common everywhere in the valley during the latter part of the season, but the earlier broods were very local; for weeks I only found them in one spot.—*P. megæra* swarmed everywhere; it was without doubt the commonest butterfly in the valley.—*Epinephele ianira*, common; *E. tithonus*, *E. hyperanthus*. I took a few specimens of each.—*Cænonympha pamphilus*, *Polyommatus phlœas*, *Lycæna icarus*, all abundant.—*Thecla rubi*, common on the moors at the top of the glen.—*L. argiolus*, one or two.—*Nisoniades tages* and *Hesperia sylvanus*, both very common. Heterocera.—*Smerinthus populi*, found four: one on a path, May 5th;

two in copulâ on June 5th; and one on June 11th.—*Zygæna filipendulæ*, abundant.—*Spilosoma mendica*, *S. lubricipeda*, *S. menthastri*, common.—*Hepialus humuli*, abundant in the meadows; the fishermen in these parts call it the night-moth.—*Nemeophila russula*, abundant in one spot, where I obtained over a dozen specimens on two successive afternoons; I never saw one elsewhere.—*Arctia caia*, several.—*Porthesia auriflua* and *P. chrysorrhœa*, took specimens of both.—*Dasychira pudibunda*, found one larva.—*Bombyx quercus*, *B. rubi*, and *Odonestis potatoria*, all abundant: as well as *Saturnia carpini* on the moorlands.—*Phalera bucephala*, abundant.—I found lots of the larvæ of *Diloba cæruleocephala*; and was lucky enough to obtain one of *Acronycta alni* exposed on an alder leaf. It has pupated in a piece of old wood, and I hope that it has not been ichneumoned. Among other Noctuæ I obtained *Acronycta psi*, *Hadena monoglypha*, *Mania maura*, *Hydrœcia nictitans*, *Xylocampa lithorhiza*, *Agrotis exclamationis*, *Phlogophora meticulosa*, *Cucullia umbratica*; and lots of the common Geometræ, such as *Rumia luteolata*, *Pericallia syringaria*, *Crocallis elinguaria*, *Amphidasys betularia*, *Bupalus piniarius*, as well as *Tephrosia biundularia* and *B. crepuscularia*.—Francis Davison Bland; Trefin, North Wales, November 22nd, 1896.

SOCIETIES.

Entomological Society of London.—*November 18th*, 1896.—Professor Raphael Meldola, F.R.S., President, in the chair. Mr. Malcolm Burr, of "Bellagio," East Grinstead, Sussex; Mr. G. H. Gale, of the Public Works Department, Hong-Kong; and Mr. A. E. Wileman, of the British Consular Service, Yokohama, Japan, were elected Fellows of the Society. Mr. Tutt exhibited a series of the ochreous form of *Tephrosia bistortata*, Goetze, known as ab. *abietaria*, Haw., captured by Mr. Mason in March, 1895 and 1896, near Clevedon, Somerset; also a series of the second brood of the same species (ab. *consonaria*, St.), bred from ova laid by the Clevedon specimens. He also exhibited a series of *Tephrosia crepuscularia*, Hb. (*biundularia*, Esp.), taken by Dr. H. Corbett at Doncaster; a peculiar variety of *Hipparchia semele*, captured by Mr. H. S. Clarke near Ramsey, Isle of Man; also a series of *Plusia bractea* bred from ova laid in July last. The eggs and larvæ had been subjected to forcing treatment, with the result that the moths emerged in October. Mr. Tutt also exhibited a very dark specimen of *Polia chi* ab. *olivacea*, captured at Meldon Park, Morpeth, by Mr. Finlay. Dr. Sharp called attention to Mr. Ernest Green's plates of the Coccidæ of Ceylon, which were exhibited on a screen in the room, and said that he was inclined to consider the Coccidæ as a distinct order of insects, but at present the evidence was hardly sufficient to warrant this. He asked Mr. Green if he could give him any information with regard to the development of the wings in the male. Mr. Green said that in the males of the Coccidæ the wings first appeared in the penultimate stage as small projections on the sides of the thorax. These wing-pads grew to a certain extent without any further ecdysis. Though the insect was then quite inactive, and took no food during this stage, the rudimentary wings and legs were free from the body, and were capable of some slight movement. After the final ecdysis the wings of the imago were fully expanded, and assumed their natural position before the insect left the sac, or puparium, in which the resting stage had been passed. Mr. McLachlan and others continued the discussion. Mr. Bethune-Baker exhibited a yellow spider from Orotava, which was of the exact colour of the flowers that it usually rested upon, and which had been observed to catch Vanessæ which settled on these flowers. Mr. Barrett said he had noticed a spider with the same habit on the ox-eye daisy in Surrey. Mr. Bethune-Baker also exhibited a very curious dark variety of *Arctia caia*, bred by Mr. Moore. Professor Meldola stated that it had been of late found difficult to store bristles in the City owing to the ravages of a moth, of which he exhibited living specimens of the larvæ and pupæ. Mr. Barrett said that the moth was *Tinea biselliella*. Mr. Blandford stated that the bisulphide of carbon treatment might be found to be of advantage if it were practicable, but more would have to be ascertained with regard to the extent and character of the ravages before anything could be determined upon. Mr. Merrifield, Mr. Green, and others took part in the discussion which followed. Mr. Blandford called attention to the use of formalin as a preventive of mould, and said that it would probably be found of use in insect collections; an object once sprayed with this substance never became mouldy afterwards. Professor Meldola said that formalin was another name for a solution of formic aldehyde: it is now much used in the colour industry, and is, therefore, produced on a large scale. Mr. Newstead communicated a paper entitled "New Coccidæ collected by the Rev. A. E. Eaton in Algeria."

December 2nd.—Dr. David Sharp, M.A., F.R.S., Vice-President, in the chair. Dr. Sharp exhibited the series of Longicorn Coleoptera of the genus *Plagithmysus* from the Hawaiian Islands, of which a preliminary account had recently been given by him elsewhere. He said that these examples were the result of Mr. Perkins' work for the Sandwich Island Committee, and afforded a fair sample of his success in the other orders, which would be found to have completely revolutionised our knowledge of the entomological fauna of these islands. He stated that Mr. Meyrick had recently informed him that the Geometridæ would be increased from six species to forty-four, and that the genus *Plagithmysus* showed an almost equal increase; and that the working out of the specimens was very difficult, owing to the variability of the species and to their being closely allied. Mr. Malcolm Burr exhibited a specimen of a cockroach, *Pycnoselus indicus*, Fabr., taken in a house at Bognor, Sussex. He said this was the first record of the occurrence of the species in England. According to De Saussure, it was distributed throughout India, Ceylon, Mexico, and the United States. Mr. P. Crowley exhibited a remarkable variety of *Abraxas grossulariata* taken in a garden at Croydon last summer. Mr. Tutt exhibited some Micro-Lepidoptera from the Dauphiné Alps. Several specimens of *Psecadia pusiella*, Röm., showing considerable difference in the width of the black zigzag band crossing the centre of the fore wings longitudinally. The species was taken at La Grave, in a gully at the back of the village. A large number of specimens were secured, chiefly resting on the trunks and branches of two or three ash and willow trees growing on the bank at the side of the gully. A few specimens, however, were obtained drying their wings on the grass on the bank, but Mr. Tutt stated that he failed to find pupa-cases. The captures were all made on the mornings of August 7th and 8th. In spite of the striking conspicuousness of the insect when set out for the cabinet, it was by no means easy to detect at first on the tree trunks. Mr. Tutt also exhibited specimens of a "plume" which had been named *Leioptilus* (*Alucita*) *scarodactyla*. It was exceedingly abundant on the *Artemisia* growing on the roadside just below La Grave. There could be little doubt, he thought, from the habits of the insect, that the *Artemisia* had been its food-plant. He also exhibited specimens, from Le Lautaret, of *Sericoris rivulana*, *Gelechia spuriella*, *Sophronia semicostella*, *Pleurota pyropella*, *Œcophora stipella*, and *Butalis fallacella*. The latter were chiefly interesting from the fact that they were taken at an elevation of about 8000 feet. Lord Walsingham made some remarks on the specimens. Lord Walsingham read a paper entitled "Western Equatorial African Micro-Lepidoptera." A discussion ensued, in which Dr. Sharp, Herr Jacoby, and others, took part.—H. Goss, *Hon. Secretary*.

South London Entomological and Natural History Society.—*November* 26*th*, 1896—C. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. Barnett, of Royal Hill, Greenwich, was elected a member. The meeting was devoted to a special exhibition of varieties, and was largely attended. Mr. Mansbridge showed series of *Abraxas grossulariata*, including the Leeds smoky forms; of *Polia chi*, including var. *suffusa* and var. *olivacea*, with the beautiful West Riding form; and of *Hibernia aurantiaria*, with many melanic forms. Mr. Oldham, *Brenthis* (*Argynnis*) *euphrosyne*, with few markings on upper wings in contrast to well-marked hind wings; a xanthic *Epinephele ianira*, and putty-coloured and yellow females of *Odonestis potatoria*. Mr. Adkin, the various forms of *Boarmia repandata*, *Camptogramma bilineata* (including black Irish specimens), *B. cinctaria* and *Thera juniperata*, with beautiful specimens of *Cidaria corylata* var. *albocrenata*, *Abraxas grossulariata*, black *Acidalia marginepunctata*, black-banded *Eubolia bipunctaria*, banded *Anaitis plagiata*, and unicolorous *Ematurgia atomaria*. Mr. Mitchell, specimens of *Saturnia pavonia* (*carpini*)—1, dark female; 2, gynandromorphous form bred from Wicken; and an example of *Chrysophanus phlœas* with large and elongate spots nearly forming a band. Mr. Dollman, a series showing the variation of *O. potatoria*; a dwarf *Anthocharis cardamines*; and an example of the same species with the dark tips of the primaries suffused and extending inwards. Mr. Ashdown, a series of *Coccinella hieroglyphica* varying from entirely testaceous, through spotted forms to entirely black, all from Oxshot. Mr. Barrett, series of the following species, from very many localities:—*Melanippe hastata*, *M. tristata*, *M. fluctuata*, *Boarmia repandata* (including some very fine black forms), *Eupithecia togata* (including the very dwarf race), *E. extensaria*, *E. sobrinata*, and *E. stevensata*. Mr. Auld, the first known bred British *Callimorpha hera* var. *lutescens*; series of *Spilosoma lubricipeda*, with its var. *zatima* and var. *fasciata*, together with a number of intermediate forms; a broad-banded *A. plagiata*; and vars. of *Dicycla oo*, *Abraxas urticæ* (without dorsal spots), and *Lomaspilis marginata*. Mr. Levett, vars. of *Callimorpha dominula*, bred from Deal, three of which were of the yellow form. Mr. Mera, three vars. of *Arctia caia*: 1, with inner half of fore wings almost completely white; 2, with white markings of fore wings only slightly indicated; 3, white almost covering fore wings and black on hind wings much diminished; a *Cidaria silaceata*, pale brown, with paler lines, reminding one of *C. reticulata; Hadena thalassina*, with absence of usual markings and of almost uniform smoky grey; an *Arctia villica* with smoky hind wings, and one with black suffused over all the wings; and a *Brenthis* (*Argynnis*) *euphrosyne* with confluent spots across the centre of both wings. Mr. Turner, the most distinctive forms of *Hibernia leucophæaria*, *Gnophos obscuraria*, and *Oporabia dilutaria;* a *Cœnonympha typhon* with a series of well-developed ocellations and a large white patch on the upper side of the hind wing, from Carlisle; and on behalf of Mr. Wilkenson, of Carlisle, a very variable series of *Melitæa aurinia* (*artemis*), including several good aberations. Mr. H. Moore, Exotic Orthoptera, including: 1, *Locusta peregrina* from several localities, showing great variation in density of colour; 2, *Pachytylus migratorius* var. *cinerascens;* 3, a long series of *Œdipoda fasciata*, from many places, and varying with the soil upon which it rests; and some ten species of American Œdipodidæ. Mr. T. W. Hall, conspicuous varieties of the following species:—*Arctia caia* (one almost black secondaries), *Spilosoma lubricipeda* (one of var. *zatima* taken at Wicken), *Sesia culiciformis* (yellow-banded), *Polia xanthomista* (var. *statices*), *Demas coryli* (banded), *Mamestra persicariæ* (unicolorous black), *Xylina conspicillaris*, and many other species. Mr. Frohawk, a grand series of under sides of *Enodia* (*Epinephele*) *hyperanthus*, varying from extreme var. *arete* to the beautiful var. *lanceolata;* and vars. of *Papilio machaon*, including a very dark tawny form bred from Wicken. Mr. Tutt, specimens of *Melampias melampus* and *M. pharte*, upon which he bases his opinion that they are only forms of one species; and a series of the hitherto supposed distinct *Cœnonympha iphis* and *C. satyrion*. Mr. Dawson, a dark male of *Dryas* (*Argynnis*) *paphia*, somewhat approaching var. *valesina* of the female; Shetland forms of *Camptogramma bilineata;* a var. *schmidtii* of *Chrysophanus phlœas*; and a *Tæniocampa incerta*, with much intensified transverse lines.—HY. TURNER, *Hon. Report Sec.*

CAMBRIDGE ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*November 13th*, 1896.—The President, Dr. Sharp, in the chair.—Mr. Fleet exhibited a copy of the first number of a work by Thomas Denny, entitled 'Illustrations of Lepidopterous Insects found in the Vicinity of Cambridge'; it contained several coloured plates, and was printed and published at Cambridge, but bore no date; also some specimens of *Zygæna exulans* from Braemar, and *Noctua sobrina* from Rannock. Mr. R. Farren showed some "jumping beans"; the "bean" is the seed of a Mexican euphorbiaceous plant inhabited by a *Tortrix* larva, whose movements cause the seeds to roll about, and even to make short jumps. Mr. Rickard, some British beetles and a common earwig with very long forceps; this latter gave rise to some discussion on the wings and flight of this insect, Dr. Sharp expressing his opinion that it seldom resorts to flight. Also some pupæ of *Orgyia antiqua*.

November 27th.—Dr. Sharp in the chair.—Mr. Jones exhibited a local imago of *Smerinthus tiliæ* with both its wings deformed and correlative variation of marking. Mr. Rickard read a paper discussing some questions in connection with the formation of lepidopterous pupæ, making reference to the so-called "Poulton's line," and the criticisms of Dr. Chapman and Mr. J. W. Tutt thereanent. He said that the proboscis of the pupa of *Acherontia atropos* is 40 mm. long; that of the imago is but 14 or 15 mm. He suggested that the brevity might be in connection with the habit of extracting honey; and also that the reason why the moth was so rarely found in beehives in this country might be found in the construction of the hives. The object disclosed by the last moult of a lepidopterous larva resembles neither a caterpillar nor a pupa, but is much more like the imago. There is also present a thick coating of gelatinous-looking material enveloping the entire organism; the external surface of this material rapidly hardens and takes on the special form of the pupa. As the lower portion of it solidifies it shrinks away from the enclosed imago, with the result that the pupal imago is left loose inside the pupal envelope, the only organic connection seeming to be the tracheæ that connect the imaginal with the pupal spiracles. Proof of the accuracy of this statement is afforded by the presence of wing-cases on the pupæ of wingless female moths. Thus the female of the *Orgya antiqua*, for instance, possessed imaginal wings of average size at the last larval moult, such wings being subsequently reabsorbed. The contradictory statements of Prof. Poulton and Mr. Tutt are easily reconciled if we suppose that the Professor's observations were made at an early stage of pupal existence, while Mr. Tutt's were made immediately before emergence of the imago.

Nonpareil Entomological and Natural History Society.—*November 5th*, 1896.—Exhibits: By Mr. J. A. Clarke, a specimen of the rare sawfly (*Sirex juvencus*) captured at Eltham on Oct. 5th. Mr. Huckett said he had no doubt it was an imported species. Mr. Clarke, however, added that he had one given him some years ago by Mr. Eddols, taken on the Hackney marshes. By Mr. Lusby, two species of *Zygæna filipendulæ*, one example showing pretty variation of the hind wings, which were rosy orange in colour and minus the dark margins. He remarked that he had bred some numbers of this species, and that any variation that occurred had always been in the hind wings; this was considered to be merely a curious circumstance, members having bred specimens in which both fore wings were aberrant. Mr. Lusby also showed a very pretty specimen of *Cœnonympha pamphilus*, the inner ground of the wings being paler than usual, with heavily developed dark borders, and minus the spot on tip of fore wings. Likewise two male specimens of *Liparis dispar*, illustrating the darkening by interbreeding. With reference to *L. dispar*, Mr. Norman, who has bred numbers of this species, remarked that the males of the successive broods get darker each year, and the females degenerate; and he was of opinion that if interbreeding was continued, the female would in time become apterous. A discussion on "The Preservation of Species (local and otherwise) from Extermination by Overcollecting, &c.," was fixed for the next meeting (Nov. 19th), and any suggestion will be welcome. Mr. J. A. Clarke drew attention to the extraordinary fecundity of *Lasiocampa quercifolia*, he having obtained 1050 eggs from one female.—F. A. Newbery, *Reporting Secretary*.

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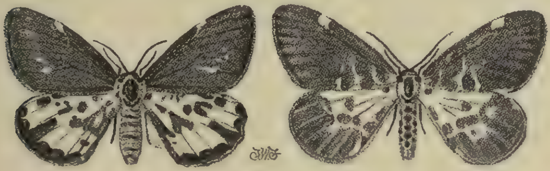
VARIETIES OF *ABRAXAS GROSSULARIATA.*



The two specimens of *Abraxas grossulariata* figured above represent the most suffused examples bred by Mr. H. McArthur from about three thousand larvæ collected in the neighbourhood of Fulham last spring, from garden euonymus (*Euonymus japonicus*), and fed up on the same plant. The majority of the imagines were rather undersized, measuring only about 1½ in. in expanse; but some few were fully up to 1¾ in. across the wings, and were of the most ordinary forms, with the exception of about thirty specimens. The prevailing form of variation in these was the increase of the dark markings, more particularly of the basal two-thirds of the fore wings; but two examples, although by no means strongly marked, convey the impression of the whole of the wings being in "water-mark," giving the insects a very remarkable appearance.

Robt. Adkin.

Lewisham, January, 1897.

ON NAMING GEOGRAPHICAL VARIETIES.

By H. J. Elwes, F.L.S., F.E.S., &c.

Mr. Harcourt-Bath (*ante*, p. 15) asks me to state my views on this subject, as he thinks that the names he suggested for supposed forms of *Parnassius apollo*, in 'Entomologist,' 1896, p. 331, are "of more importance in their relation to the type than the forms of many other species of European Rhopalocera" he "could name which have already received distinctive recognition." It is quite impossible to lay down any hard and fast rule on this subject. In every case as it arises one must be guided by experience, and especially by the amount and character of the variation which occurs. In some very wide-ranging species, as *Vanessa cardui* or *V. antiopa*, no one has hitherto thought it worth while to separate supposed geographical varieties, though, as shown by Mr. Kirby's recent note (Entom. xxix. p. 318), it might be done by those who wish to multiply such names as much as possible. Other species, such as *Melitæa didyma* and *M. phœbe*, show such comparatively constant local variations in certain districts that it is perfectly possible for anyone having a sufficient knowledge of their variations to say where a very large proportion of the specimens have come from; but, in order to do this, one must have such a collection as, I am sorry to say, is hardly to be found in England at present.

The experience which I have gained during many years of collecting in Europe, Asia, and America, and a personal knowledge of the best collections of Lepidoptera in Europe and the United States, inclines me to think that the larger the series of varieties one examines from many different localities and the greater the knowledge one acquires of them, the more difficult it becomes to define local races accurately. And this applies to birds and plants as much as to Lepidoptera. It is the local collectors who are always most in favour of named local varieties; and though Dr. Staudinger's collection, which perhaps is unequalled for its richness in local varieties by any other collection of natural-history specimens in the world, may be cited in opposition to my opinion, yet I have often found that his personal inclination is against the undue multiplication of varietal names, and that he is as ready as anyone to admit that local races are often impossible of exact definition.

I will now proceed to deal with these particular forms about which I think Mr. Harcourt-Bath is wrong. First of all, there is no reason why he should take "the prevailing form found in the alps" as the type of *P. apollo* because Linnæus described the species, presumably from specimens of his own country, and, if so, the form named by Mr. Harcourt-Bath *scandinavica* would be the type. I have four males and five females from Sweden and Norway, which are, it is true, larger than the average from the Swiss alps, but do not show the submarginal wavy band of dusky scales in the hind wing in either sex more strongly than many alpine specimens. Thus his only character for defining *scandinavica* falls to the ground. Secondly, as to the variety he calls *pyrenaica.* I have only kept two pairs, which I took at Vernet in the Eastern Pyrenees, and which I am certain no one could pick out from my alpine specimens if I took the labels off; but if a variety occurs in the Pyrenees showing the characters given by Mr. Harcourt-Bath, namely, a lighter colouring of the male and a darker colouring of the female, then it would stand under the name of *hesebolus*, Nordm., from Central and Eastern Siberia, which is defined by Staudinger as follows:—"v. major, ♂ albidior, ♀ obscurior." This definition, however, is not applicable to all the Siberian specimens; and, so far as my own specimens go, is more applicable to those from the Ural than to those from the Altai mountains. Now we come to the variety *siberica*, of which Mr. Harcourt-Bath simply says—"The specimens from Siberia are larger, according to various authorities, but I do not know in what other particulars they differ from the type." Clearly his knowledge of this form, if it is one, is absolutely insufficient to justify him in naming or defining it. Lastly, he says that "all the specimens of *apollo* from the Alps, the Pyrenees, and the Jura, may be divided into two sets according to their tints, in one of which it is of a delicate cream colour, although in the majority of specimens it is white." For the cream-coloured form he would like to suggest the name *pulchella.* Now as he has already suggested the name *pyrenaica* for the Pyrenean insect, and as *pulchella* implies something smaller, this name is clearly inappropriate, even if two forms from the Alps and the Jura could be defined at all. In most of the species of *Parnassius* very freshly-emerged specimens are cream coloured, fading to white when they have flown for a day or two.

Having thus given reasons for my opinion that these particular names cannot be accepted, I would tell Mr. Bath that the forms of *P. apollo* from the Carpathian and Ural mountains and from Spain, which he does not appear to know, and probably many other local varieties which I do not know, show differences as great or greater than those he has mentioned; so that if these names are admitted several others will have to be added; and if this is so in a species like *apollo*, the result of a similar treatment of some much more variable species would be to bring the whole system of scientific nomenclature, already quite difficult enough, to a hopeless state of confusion.

Colesborne, Gloucestershire.

NOTES ON BRITISH ORTHOPTERA.

By Malcolm Burr, F.E.S.

The kindness of Mr. Guermonprez, of Bognor, has recently allowed me to inspect some of the specimens in his collection of British Orthoptera. Some of the localities are new; and the capture of *Pycnoscelus indicus* and *Œdipoda cærulescens* is very interesting. The former bids fair to become cosmopolitan, and, like other cockroaches, will perhaps be some day naturalised in England. Our claim of the latter as a British species is based on the capture of two, many years ago, at Southampton, most probably, as Mr. Dale suggests, imported with vegetables from Jersey, where it is common. There are two now in the British Museum collection, which I believe are the original pair. The following list includes the more interesting species:—

Ectobia livida, Fab. Pupæ. Charlton Forest, in North Sussex, and at Bognor.—*E. lapponica*, L. A male from a wood near Cocking, Sussex; and two, which I have not seen, similar individuals, from Wood Eartham and Dane Wood, in Sussex.

Pycnoscelus indicus, Fab. Two specimens, taken some time ago in a house in Bognor; evidently imported from abroad. This species is indigenous to India and Ceylon, and has spread with trade to the United States and Mexico. I am not aware that it has been taken before in this country. (At p. 21, line 13 from bottom, for *Pycnoselus* read *Pycnoscelus*.)

Stenobothrus elegans, Charp. Pagham Marsh, Sussex.

Gomphocerus maculatus, Thunb. Heyshott and Cocking and Eartham, in Sussex; also Tonbridge Wells.

Œdipoda cærulescens, L. One mutilated specimen. As to data, Mr. Guermonprez says that his recollection of its locality is "decidedly hazy," but he thinks near London. It was taken many years back, probably before 1870.

Tettix bipunctatus, L. Dorking; Hayling Island; Dale Park.

Leptophyes punctatissima, Bosc. Dorking; Blear Wood, near Herne Bay, in November (imago); Bognor, at sugar at night, and on palings.

Meconema varium, Fab. Dale Park; near Bosham; Bognor, at night, on palings and at sugar.

Xiphidium dorsale, Latr. Pagham Marsh.

Locusta viridissima, L. Bognor.

Platycleis brachyptera, L. A male from Broadwater Down, Tonbridge Wells.—*P. roeselii*, Hagenb. A male from a field at Herne Bay; probably the same locality where Mr. Saunders took this rare species (Ent. Mo. Mag. n. s. i. (1890)). One pupa from Par, Cornwall, seems to be referred to this species, the pale border on the lateral lobes of the pronotum showing up distinctly; but this border is more or less visible in the first stages of *P. grisea*, Fab., in which species it is lost before arriving at the nymph stage.

Thamnotrizon cinereus, L. A female was taken at Aldwich, in

North Sussex, in October, laying its eggs in an elm trunk at night, with the ovipositor firmly fixed into the trunk.

Gryllotalpa vulgaris, Latr. By Chichester canal.

Bellagio, East Grinstead.

DRAGONFLIES IN 1896.

By W. J. Lucas, B.A., F.E.S.

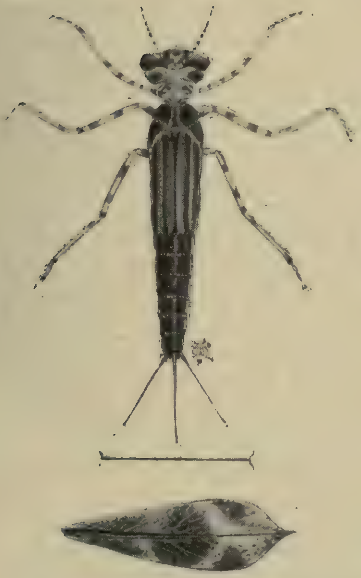


Fig. 1.—*Pyrrhosoma minium*, Harr.

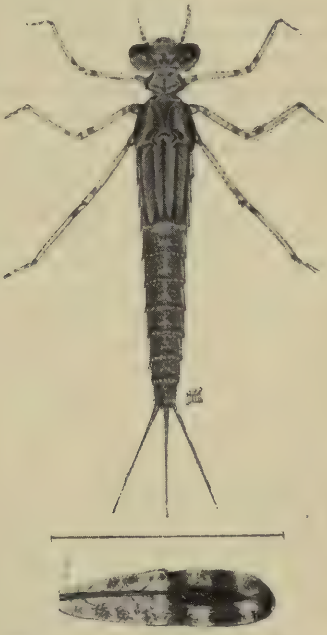


Fig. 2.—*Erythromma najas*, Hans.

Remarkable in many ways has been the season of 1896. After an almost frostless winter in the South of England, the end of April and beginning of May, when dragonflies commence to appear, was cold and ungenial, and the early species were a few days later than usual in coming on the wing. The season, however, as it grew older, improved continually, and must probably be set down as a good one until summer suddenly collapsed in the middle of August. But even after that, on the few scattered fine days that occurred, some species were to be taken, and in good numbers, until the latter end of September.

What, however, constitutes the most striking feature of the season was the long summer drought, and it will be interesting to note during the next three years its effect, especially on those species which had oviposited early in the year before the drying up of the ponds and smaller streams. Information is unfortunately scanty with regard to such periods of drought, but what little there is seems to point to the fact that they have but slight harmful effect on odonate existence. The eggs probably remain imbedded in the mud, where sufficient moisture remains to keep alive the little speck of protoplasm, and it is not too much to suppose that the nymphs may maintain their existence under the same conditions. In this connection Mr. McLachlan's observation of *Agrion mercuriale*, ovipositing in mud in Savoy in 1884 (Ent. Mo. Mag. 1885, p. 211), and of *Pyrrhosoma minium* doing the same in the New Forest in 1895 (Ent. Mo. Mag. 1895, p. 180), are most useful. My own observation during last autumn of the eggs and freshly hatched larvæ of *Sympetrum vulgatum* tend to shew their hardiness. For, about the 15th of September last a female laid in a collecting-box a large number of eggs (some two or three hundred perhaps), which were elliptical in section, the major axis being about ½ mm. On reaching home I placed them in water, and about a month later the young larvæ commenced hatching out, and others continued to appear for a month or so longer. Though many of them were hatched in a porcelain evaporating dish about four inches in diameter, and could have had practically no food for weeks, their vitality did not seem to be impaired, and few, if any, died. They have now been removed to better quarters, where they may perhaps thrive, in which case some of them, in three years or so, may produce imagines in spite of their early fast; for dragonfly nymphs do not seem to sustain any permanent harm from being kept for weeks without food in the smallest quantity of water and that of a very stagnant nature.

It is in connection with the immature state of these insects that the odonatist has most opportunities of opening new ground, and it is a distinct advantage that he is able to carry on his observations and do most useful work during the winter and early spring. Of course some kind of vivaria will be required to contain the nymphs that are being bred. Mine consist of glass fish-globes filled with water, mud, and weeds, with a few sticks or reeds projecting about a foot above the surface of the water, so that no misfortune may happen when the time for the emergence of the dragonflies arrives. In these, last year, I reared *Æschna cyanea*, *Agrion puella*, *Ischnura elegans*, *Pyrrhosoma minium*, and *Erythromma najas*, the last two of which I have described and figured.

Nymph of Pyrrhosoma minium, Harr. (fig. 1).—In shape it is long and slender, though less so than some others of the *Agrionidæ*: length, including the caudal lamellæ, 19 mm., greatest breadth about 2·5 mm.: general ground colour dark sepia-brown. The head is somewhat rectangular, about 3·25 mm. by 1·75 mm.; the sides, however, slope considerably backwards: eyes large, pear-shaped, situated at anterior corners of head, and each extending a third of the way across, in colour dark: between the eyes are three whitish spots as well as some dark markings: the occiput (for the shape of which see figure 1) bears centrally a palish rectangle with dark boundary and crossed by two small parallel lines: the posterior corners of the occiput bear conspicuous spines: antennæ 7-jointed, the third from the base darker than the rest, and all joints darker anteriorly: mask spoon-like, triangular, the base of the triangle, which is anterior, a convex curve, and the apex truncated; it extends to the insertion of the first pair of legs; the two moveable portions bear a row of hairs along the margin, and terminate in a pair of hooks, which interlace when the mask is drawn back and at rest. The prothorax is small, rectangular with the four corners removed, and bears some whitish markings, notably a streak in the middle line of the animal. Wing-cases long and straight. The legs are long, paler than the general ground colour, and are marked on the femora with two dark rings, and on the tibiæ with one rather faint one: the tarsal joints of all the legs are three in number, the basal one being very small. The abdomen tapers posteriorly, the segments being fairly equal: each except the tenth bears along its posterior margin a row of small white dots, and there is a whitish lateral line along each segment: in the mid-dorsal region is a pale line, having on each side of it a black dot in each segment except the tenth. The caudal lamellæ are 5·5 mm. in length; they have a sharp point at their extremity and a strong median vein: in colour they are pale, much blotched with brown and spotted with still darker brown. The end of the tenth segment of the abdomen is surrounded with small points, and between the dorsal and each of the lateral lamellæ is a small conical projection.

One specimen that could not find its way out of the water developed the crimson colouring under the pupal skin before being drowned. An imago, a great part of whose emergence I watched about 9 a.m. on April 26th, got its immature—yellowish—colouring during the day; but I have never kept one alive long enough for it to put on its full crimson dress.

Nymph of Erythromma najas, Hans. (fig. 2).—In shape it is very long and slender. Length, including the caudal lamellæ, 30 mm., greatest breadth about 3.75 mm.: general ground colour dark sepia-brown. Head rectangular, very narrow from front to back, 4·75 mm. by 2 mm.: eyes rather small, somewhat hemispherical, situated at anterior corners of head, dark in colour; between the eyes are a few dark dots and markings: on the central part of the occiput, which is very narrow, are also some dark markings, while its posterior corners bear conspicuous spines as in the last species; antennæ six-jointed, basal two stout and dark, next long, slender and dark, with a pale ring round centre, the rest short, pale and slender: the mask is scarcely to be distinguished from that of *P. minium*. The prothorax is small and pentagonal, the base being towards the head; on it are one or two dark lines. Compared with those of *P. minium* the wing-cases are short. The legs are rather long, paler than the general ground colour, and each carries two dark rings, one on each side of the junction of femur and tibia; there are three tarsal joints to each leg, the basal one being very small: all the legs have several longitudinal rows of small dark points. The somewhat hairy abdomen tapers gradually to the posterior extremity, and is irrorated with small black dots: the segments are fairly equal, and each, except the tenth, is bounded posteriorly by a line of about eight white dots: each segment except the tenth has a lateral spine: a medio-dorsal pale line may just be distinguished, and on each side of it, rather nearer the hinder edge of each segment, is a pale mark: there is also a pale lateral line, but not showing so distinctly as in *P. minium*. Very different from those of the last species are the caudal lamellæ: they are 8 mm. long, and of much the same width throughout, about 2 mm.: the tip is rounded, and each lamella is divided into two parts; the basal half has the margin toothed, especially on the upper edge of the central one and the lower edge of the other two (for the outer ones are reversed in position): the decided nick on the more toothed margin is very noticeable: the apical half of the lamella has an entire margin,* and bears three transverse brown bands, and a longitudinal one along the median vein, which is stout: the venules have their smaller branches conspicuously dark in colour and arborescent in structure. The points and conical projections at the end of the abdomen resemble those of *P. minium*.

If these two descriptions are compared, it will be seen that the species are closely allied, but, just as in the perfect insects, the resemblances, though striking, are accompanied by numerous points of difference.

In the Libelluline group of dragonflies (*Libellulidæ*) are to be found ten British species—*Leucorrhinia dubia*, Lind., *Sympetrum vulgatum*, Linn. (=*striolatum*, Charp.), *S. flaveolum*, Linn., *S. sanguineum*, Müll., *S. scoticum*, Don., *Platetrum depressum*, Linn., *Libellula quadrimaculata*, Linn., *L. fulva*, Müll., *Orthetrum cærulescens*, Fabr., *O. cancellatum*, Linn., and one occasional visitant, *S. fonscolombii*, Selys. Of these, during the season, I secured six—*S. vulgatum*, *S. scoticum*, *P. depressum*, *L. quadrimaculata*, *O. cærulescens*, and *O. cancellatum*.

S. vulgatum I took commonly in Surrey and in the New Forest. One I probably saw as early as June 28th, near Pyrford, Surrey; but my first capture was a female on July 5th in the New Forest; and the last I saw were on Sept. 20th, at the Black Pond, in Surrey. They were very plentiful near Wisley, in Surrey, in the middle of the month last named. Specimens vary considerably in size and in the amount of red in their colouring: the wings, too, are sometimes very dark, age probably being the cause of the darkening. *S. scoticum* I captured in two localities only (both in Surrey), where, however, they were very plentiful. The first one was met with on July 11th, at the Black Pond, and it was still on the wing there on Sept. 20th. This species also varies considerably in size, a female taken on Sept. 9th being very small. Darkening of the wings does not occur, but the females show a varying amount of orange colouration at the base. A remarkable point in connection with this dragonfly is the striking difference between the yellow colour of the immature insect and the almost black tint of the adult.

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* When a lamella is prepared in canada-balsam for viewing with a compound microscope, the apex is found to be fringed with fairly long, but very slender, colourless hairs, not shown in the figure.

Whether *P. depressum* was scarcer than usual last season I cannot say, but I noted it on four occasions only, three being in Surrey—a female on May 10th; another on June 1st, on the wing, between 5.30 and 6 p.m.; and a third on June 14th; while as late as Aug. 2nd I took yet another female, in the New Forest, with the blue colouration on the abdomen as in the male. This one was very late in the summer; can it be that the blue colour was due to age?

This season I did not meet with *L. quadrimaculata* till May 10th, when it was out in good numbers at the Black Pond. By June 14th its numbers were fewer, and it was almost over on July 19th. I also found the species near Brockenhurst on July 5th; in good numbers over ponds near Wisley on May 17th and 23rd; and in smaller numbers at the Basingstoke Canal on May 23rd and June 20th. The Four-spotted Dragonfly is given to vary in two directions. Sometimes a dark cloudy colouration is developed on the four wings in the region of the pterostigma, while again (and often in the same individual) the saffron tinge found at the base of the wings may spread along the costal region almost to the tip of the wings. There seemed to me to be more instances than usual of both varieties last season, and I took three very nice specimens of the former (*prænubilia*, Newm.), which are usually scarce. At the Black Pond, on June 21st, a male was secured eating a *P. minium:* this is the first time I have observed cannibalistic tendencies in a dragonfly, as well as the first time I have seen one of these insects fall a prey to another animal.

O. cærulescens I met with only in the New Forest, where in several localities it was plentiful at the beginning of August. The males appeared to be less common and more difficult to catch than the females, which are very liable to be confused with *S. vulgatum:* the former, however, were not usually secured over water, as were the latter. *O. cancellatum* was just coming on the wing on May 17th near Wisley, and I took an immature female. On July 26th I spent some time trying without success in Richmond Park, to catch what could scarcely have been anything else than a fine male of this species.

Four of the *Corduliidæ* are found in Britain—*Cordulia arctica*, Zett., *C. metallica*, Lind., *C. ænea*, Linn., and *C. curtisii*, Dale. Of these I came across one only—*C. ænea*—in 1896, and but few specimens of this. The dates were, at the Black Pond on May 10th, May 31st, and June 14th; at the Basingstoke Canal on May 23rd.

Of the *Gomphidæ* but two species are natives of Britain—

Gomphus vulgatissimus, Linn., and *Cordulegaster annulatus*, Latr.; and of these two I met with only one last season, *C. annulatus*. On July 5th I secured three males in the New Forest, and also had one brought to me that was taken the same day near Ottershaw, in Surrey. On Aug. 6th and 12th I took, in the New Forest, six specimens in all, only one of which was a female. This dragonfly, in the Forest, in almost every instance was flying backwards and forwards along the streams close to the surface of the water, and it was usually not difficult to intercept it in its course and effect a capture. None of the Odonata give greater satisfaction than does this one, for, if ordinary care is used in abstracting the contents of the abdomen, the insect in the cabinet looks almost as bright as when it was freshly caught.

Coming now to the *Æschnidæ*, we find eight species inhabitants of our islands:—*Anax formosus*, Lind., *Brachytron pratense*, Müll., *Æschna mixta*, Latr., *Æ. borealis*, Zett., *Æ. juncea*, Linn., *Æ. cyanea*, Müll., *Æ. grandis*, Linn., *Æ. rufescens*, Lind.; and of these I met last season with all except three—*Æ. mixta*, *Æ. borealis*, and *Æ. rufescens;* but with the exception of *A. formosus*, which was common at the Black Pond, they appeared to me to be in smaller numbers than usual.

Of *A. formosus* I secured a good number of specimens, all but one being males; several, however, were in poor condition, the cause perhaps being that they cut their wings when flying amongst the reeds. They were taken on June 14th, 21st, 27th, and July 11th and 19th, all at the Black Pond. On June 20th I saw one taken at the Basingstoke Canal near Byfleet. At the Black Pond, when not on the wing during the day, they seem to rest down amongst the reeds; but as their time for retiring approaches they fly higher, amongst the firs, where probably they roost. It is surprising at what a distance this dragonfly can see a comparatively small insect, which, nevertheless, it often turns away from when within a few inches of it. *B. pratense* I saw at Wisley Ponds on May 17th, and near Byfleet on May 23rd. Of *Æ. juncea* I took but two—one, a female, at the Black Pond on Sept. 15th, as she was resting on the surface of the water ovipositing; and a male on Sept. 16th at Wisley Ponds. *Æ. cyanea* was seen on several occasions, notably at Bagley Wood, Berks, in the middle of August, but no captures were made. I, however, bred a female on April 26th, and another on May 25th. One *Æ. grandis* fell to my net on August 20th at Hincksey near Oxford. I probably saw it first on July 11th, and last on Sept. 9th.

Both British species of the *Calopterygidæ* I met with in large numbers last season—*Calopteryx virgo*, Linn., in the New Forest; and *C. splendens*, Harr., at many places in Surrey. *C. virgo* was observed on July 5th, and again during the first fortnight in

August. It haunts the banks of streams, especially where there is plenty of vegetation. On July 5th I secured a male with its right fore wing wanting in the blue pigment. This is not an uncommon aberration; sometimes all the wings are similarly deficient, and this brown-winged form was named by Stephens *anceps*. In Surrey *C. splendens* seems also to like the banks of streams and canals where the vegetation is luxuriant. I found it last season in large numbers, my first specimen being seen on May 17th, and the last on June 28th, when, however, the insect was probably by no means over. I met with a few stragglers at the Black Pond, where I had not observed it before.

Amongst the *Agrionidæ* are to be found twelve British species:—*Lestes nympha*, Selys, *L. sponsa*, Hans., *Platycnemis pennipes*, Pall., *Erythromma najas*, Hans., *Pyrrhosoma minium*, Harr., *P. tenellum*, Vill., *Ischnura pumilio*, Charp., *I. elegans*, Lind., *Agrion pulchellum*, Lind, *A. puella*, Linn., *A. mercuriale*, Charp., and *A. cyathigerum*, Charp. Of these I took last season all except *L. nympha*, *I. pumilio*, and *A. mercuriale*.

Three male *L. sponsa* were netted in the New Forest on Aug. 10th, over a tiny pond from which the water had gone, leaving only weeds and mud.

Of *P. pennipes* I took two in the New Forest on July 5th, and a good number near Pyrford, in Surrey, on June 28th. Most of those in Surrey were caught along a ditch about a couple of yards wide, where they flew close to the water, the bluer specimens looking like *A. puella* or *A. cyathigerum*. Two or three were taken over grass. The colour of the female, which is considerably more robust than the male, is yellowish, sometimes with a greenish tinge: the male varies from yellowish white to pale blue, the head being of a blue with a slightly green tinge. The markings are black, and they vary to a much greater extent than does the ground colour. The feathered legs are very distinctive.

Early in May I bred a few examples of *E. najas* from nymphs taken from the Basingstoke Canal on April 25th. On May 17th two were taken near Wisley, and on May 23rd and June 20th I took them in plenty over the Basingstoke Canal. Most of the mature insects were flying, often at a fair pace, over the water, and kept out of reach, seeming to be timid of one's approach. They often settled on *Potamogeton* or some similar floating weed, if not sometimes on the water itself. The immature insects seemed to keep away from the water. On the wing the male somewhat closely resembles a rather bulky *I. elegans*.

P. minium began to emerge indoors as early as April 7th, but the first outdoor specimens I saw occurred at the Black Pond on May 2nd. The last specimen noticed was in the New Forest on Aug. 3rd. *P. tenellum* was coming on the wing at the Black Pond on June 14th, and I took my last specimen at the same place on Sept. 15th. On Aug. 4th I came across it in the New Forest.

On May 24th I first met with *I. elegans* on Wimbledon Common, and the last I saw was in the New Forest on Aug. 4th. I also found it near Byfleet; near Pyrford, and in Richmond Park, in Surrey; and in Bushey Park, in Middlesex. On June 20th I took by the Basingstoke Canal two with orange markings on the thorax, which perhaps belonged to a variety parallel with *rubellum* of Curtis in the case of *I. pumilio*.

Of *A. pulchellum* I took one on May 6th at Wisley Ponds, and a few on May 23rd and June 20th in a very restricted spot by the Basingstoke Canal. *A. puella* was first seen at the Black Pond on May 3rd, and last at the same place on July 19th. I took it also in several other spots in Surrey. It is doubtless true that this insect seldom inhabits the same locality as its near relative *A. cyathigerum;* nevertheless it was in fair numbers amongst the swarms of the latter at the Black Pond last season. *A. cyathigerum* was noted as occurring in the New Forest and in several localities in Surrey, my first date for it being May 10th, and the last Sept. 20th. The distinguishing mark on the second segment of the abdomen varies considerably.

Of the thirty-nine species of British dragonflies it will be seen that I met last season with no fewer than twenty-four, and those in three districts only—Mid-Surrey, the New Forest, and Oxford, the last of which might almost be omitted.

21, Knight's Park, Kingston-on-Thames.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from vol. xxix. p. 235.)

Rivula sericealis, *Scop.*—Everywhere abundant.

Zanthognatha grisealis, *Hb.*—Widely distributed. Kingstown (*B.*), Belfast (*W.*); Cromlyn, Westmeath; Armagh (*J.*); Kenmare; Markree; Farnham, &c.

Zanthognatha tarsipennalis, *Tr.*—Fairly common. Galway (*B.*) and Clonbrock; Cromlyn (*Mrs. B.*); Markree, and near Sligo (*R.*); Banagher; Farnham; Castle Bellingham (*Th.*), &c.

(Pechypogon barbalis, *Clerck.*—Stated to have been taken near Belfast (*W.*); but I have not authenticated the record.)

Bomolocha fontis, *Thnb.*—Not rare in Kerry about Killarney and Kenmare; shores of L. Foyle near Derry (*W. E. H.* and *C.*); Ardrahan, Co. Galway; Cappagh, Co. Waterford.

Hypena proboscidalis, *L.*—Everywhere abundant.

Hypenodes costæstrigalis, *St.*—Cork (*S.*); Markree Castle, Sligo; Ardtully, Co. Kerry.

Tholomiges turfosalis, *Wk.*—Common at Killarney (*B.*).

Brephos parthenias, *L.*—Westmeath (*Miss R.*).

GEOMETRÆ.

Uropteryx sambucaria, *L.*—Widely distributed, but very variable in numerical distribution. Often abundant in the suburbs of towns, as Kingstown and elsewhere near Dublin; and in some country districts, as near Kenmare, and at Drumreaske. A few localities are appended to illustrate its range of occurrence. Sparingly about Inishowen and Derry (*W. E. H.* and *C.*); Armagh and Carlingford (*J.*); near Belfast, common (*W.*); Westmeath, occasional; Cappagh, Co. Waterford; Bandon and Doneraile, Co. Cork.

Epione paralellaria, *Schiff.*—Erroneously recorded from Powerscourt. The only Irish locality seems to be Clonbrock, Co. Galway, where Mr. Dillon has bred a few, and captured a number in flight.

Epione apiciaria, *Schiff.*—Very widely distributed, and locally sometimes rather numerous, as at Belfast (*W.*); Derry (*C.*) and Donegal; it occurs also at Markree Castle and Lissadell, &c., near Sligo; Enniskillen; Favour Royal, Tyrone; Armagh (*J.*); Farnham, Cavan; Castle Bellingham (*Th.*); Killynon, Westmeath (*Miss R.*); Clonbrock and Ardrahan, Co. Galway; Bray, Powerscourt, and Greystones, Wicklow; Mallow, &c.

Rumia luteolata, *L.*—Everywhere abundant.

Venilia macularia, *L.*—Very local, but numerous where found, and variable in marking; but I have seen no specimens of var. *quadrimaculata*. Powerscourt (*B.*) and Devil's Glen (*Bw.*), Wicklow; Cappagh, Co. Waterford, and Ardtully (*Miss V.*), and Cloonee, Co. Kerry; near Cork (*Sandford*); Clonbrock (*R. E. D.*), Castle Taylor (*Miss N.*), and near Galway (*A.*); Rockwood, near Sligo. I have no northern localities.

Angerona prunaria, *L.*—Apparently confined like the preceding to the S. and W. of Ireland, where locally numerous. The banded form of both sexes occurs. Clonbrock (*R. E. D.*), Galway; Cratloe near Limerick; Glengarriff (*Carpenter*), and about Killarney; Cappagh, Co. Waterford (*Miss V.*).

Metrocampa margaritaria, *L.*—Throughout Ireland. Often common.

Ellopia prosapiaria, *L.*—This pine-feeding Geometer, if strictly restricted to that food-plant, must have (like *Panolis* *piniperda*) been introduced into this country during the last few hundred years, when settlers began to import and plant conifers, the indigenous pine having become extinct about the time of Elizabeth. According to 'Cybele Hibernica' there is no satisfactory proof of the survival of our native *Pinus sylvestris*. The forests of Wicklow, in which some 900 years ago the King of Leinster cut a tribute of fir masts for Brian Boru, survives only in oak and other trees which spring from the stools, or the free-seeding birch. Nevertheless this moth is now very widely distributed, and sometimes not uncommon. The green variety *prasinaria*, Hb., has not yet been observed; but one or two dingy examples, in which the pink tint is scarcely to be traced, have been taken at Castle Bellingham (*Thornhill*) and near Sligo (*R.*). Pale specimens also occur, and the transverse bars vary in strength of marking. Localities: abundant near Derry (*C.*) and Belfast (*W.*); Newcastle, Co. Down (*Bw.*); Stranorlar, Donegal; Markree, Hollybrook, and Sligo; Tempo Manor near Enniskillen (*Langham*); Favour Royal, Tyrone; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Westmeath; Toberdaly, King's Co.; Castle Bellingham (*Th.*); Howth, Balbriggan, and one at the lighthouse at Rockabill three miles off the Dublin coast; Powerscourt (*B.*), Killarney, Bray (*S.*), and Greystones, Wicklow; Portarlington (*B.*); Dromana, Cappagh, Co. Waterford (*Miss V.*); Markree, Hollybrook, and Sligo; Moycullen (*Miss R.*), Clonbrock (*R. E. D.*), and Woodlawn (*A.*); in Cork, abundant; and at Killarney, Cloonee L., Glenflesk, Glengarriff, the shores of Bantry Bay and Crookhaven, Kerry, &c.

Eurymene dolobraria, *L.*—Recorded as Irish by the late Alex. R. Haliday. Single examples have been captured by Dr. Cosgrave at Swords, Co. Dublin; Mr. Donovan at Mucross; Mrs. Battersby at Cromlyn and Killynon (*Miss R.*), Westmeath; Rockwood, Sligo (*McC.*); and Tempo Manor, Enniskillen (*Langham*). I have taken several at Drumreaske, Monaghan, and Merlin Park, Galway; and at Clonbrock it is fairly numerous, Mr. Dillon having taken both the imagines and larvæ freely; and these specimens are unusually large and fine.

Pericallia syringaria, *L.*—One at Cappagh, Co. Waterford (*U.*); several at Clonbrock (*R. E. D.*).

Selenia bilunaria, *Esp.*—Very widely spread; from Derry (*W. E. H.*) and Ballycastle, Co. Antrim, to Cork. In some places. as at Favour Royal, Tyrone, and Castle Bellingham, Louth, very plentiful. Irish specimens of the spring emergence seem to me remarkable both in richness of colour and size, often being nearly two inches in expanse. The summer form, *juliaria*, also occurs.

Selenia lunaria, *Schiff.*—Very local. First recorded from Powerscourt, Co. Wicklow, by Mr. Barrett, where in 1889 I again met with a few specimens. It is also to be found at Hollybrook, Co. Sligo (*Miss ff.*); Killynon, Westmeath (*Miss R.*); Favour Royal, Tyrone; and Enniskillen; but except at Clonbrock, Co. Galway, where several have been captured by Mr. Dillon, single specimens only have been taken. The summer form, *delunaria*, has not been yet noticed in Ireland to my knowledge.

SELENIA TETRALUNARIA, *Hufn.*—Not known, except at Clonbrock, whence Mr. Dillon reports numerous captures.

ODONTOPERA BIDENTATA, *Clerck.*—Everywhere numerous. Very dusky brown forms occur with the outer margin external to the elbowed line darkly shaded. Every gradation of paler forms, some tinted with ferruginous, are also to be found, with the markings sometimes strongly and sometimes slightly represented. A very remarkable aberration, with speckled ochreous ground colour and very dark transverse lines and discoidal spots, occurs rarely, which I have not seen in English collections. Some specimens have the two transverse lines of the fore wing joined by a longitudinal streak beneath the discoidal spot, formed by the darkening of that portion of the median nervure.

CROCALLIS ELINGUARIA, *L.*—Very widely met with, but not usually in any numbers. It varies somewhat in the tint of the median band, which sometimes is strongly coloured.

(To be continued.)

SILK-PRODUCING LEPIDOPTERA.

By ALFRED WAILLY.

(Concluded from vol. xxix. p. 356.)

European Species.

Of the six species I am going to name, only one produces silk of any value, that is *Lasiocampa otus*, found in Turkey, Hungary, and Asia Minor. *Saturnia isabellæ* has a thin cocoon of rather fine silk; the others produce coarse silk.

ATTACUS PYRI, S. V., Godart (*Saturnia pavonia major*, Linn.). Central and Southern Europe. The larva feeds on peach, almond, pear, apple, plum, elm, ash, and other trees. In France the larva reaches its full size in August. It forms its cocoon on walls, between branches or at the foot of trees.

ATTACUS CARPINI, S. V., God., Dup., Bdv. (*Saturnia pavonia minor*, L.) All over Europe, even in the North of England. The larva feeds on elm, hornbeam, birch, willow, blackthorn, bramble, heath, &c. This species is earlier than the preceding one, the moths emerging generally in April. The larvæ hatch in May, form their cocoons, of a pear-like shape, about the middle of July, in the bushes.

Attacus spini, Borkhausen (*Saturnia pavonia media*, Fab.). Germany, Austria, Hungary. This species, it is said, can only pair in the open air. I could never obtain the reproduction of this species in captivity after several years' trial. In 1881, with forty cocoons, I only obtained seven or eight moths; the pupæ, like those of *A. pyri* and *A. carpini*, remaining two and sometimes three years before the emergence of the moths. The *spini* moths, in 1881, commenced to emerge on April 17th, the *carpini* on the 30th. From this, *spini* would appear to be a still earlier species than *carpini*. The larva feeds on the blackthorn (*Prunus spinosa*). The cocoon is larger and more silky than that of *carpini*, and it has an oval shape. The moth, somewhat similar to that of *pyri*, but of course much smaller, is of the same colour and size in both sexes; whereas, as is well known, there is a striking difference in size and colour between the male and female *carpini*.

Saturnia cœcigena, Hübner. Dalmatia, Turkey, Asia Minor. From information just received, I learn that this species hybernates in the ovum state, and the larva feeds on oak.

Saturnia (*Actias*) isabellæ. Central Spain. Splendid species, discovered by M. Meig, described and figured in the 'Annales de la Société Entomologique de France,' 1850, p. 241, pl. viii., by Professor Graells. The moth is of a deep green, with brown nervures. The larva is green, the head and the middle of the segments brown, and there are two long red spots bordered with white along each segment; it feeds on the forest pine (*Pinus sylvestris*).

Bombyx (*Lasiocampa*) otus, Drury. This silk-producing Bombyx is, it is said, that from which the Greeks and the Romans obtained their silk before the introduction of the mulberry silkworm from China. What has become of this famous silkworm? One of my correspondents in Sicily, M. J. Pincitore Marott, of Palermo, in an article which appeared on August 1st, 1873, in the 'Petites Nouvelles Entomologiques,' speaks of the discovery and propagation of this remarkable silkworm in Italy, and in a passage of his report he says:—"The *Bombyx otus* is of great importance, for its silk-producing caterpillar may perhaps replace that of the *Bombyx mori;* the silk obtained from this species is almost as fine as that produced by the *Yama-maï*. The true country of *B. otus* being Asia Minor, its discovery in Italy proves that our climatic conditions and flora, at least in part, are somewhat similar to those of the East, and that the rearing of *B. otus* could be done successfully. M. Correale, of Scandole, near Crotone in Calabria, was the first to discovered the *otus* moths in Italy, and his attempts to rear this species on a large scale, up to the present, have been crowned with success." These remarks were published by Professor Cornalia, in the 'Annali di Storia Naturale,' vol. viii., 1865. M. Marott adds that the *B. otus* was not rare in 1873 in southern parts of continental Italy, and that he found it also in the environs of Monte-Cuccio (Palermo). The larva of *B. otus* feeds on the lentisk (*Pistacia lentiscus*), a shrub which grows naturally on the coasts of the Mediterranean, in Africa, Syria, Greece, Turkey, and other parts. Live cocoons of *otus* can now be easily obtained, and in 1889 I had a quantity of them sent to me by a naturalist of Zara, Dalmatia, who reared the larvæ on a species of evergreen oak (*Quercus ilex*). The cocoons are white, very rich in silk, and very large, the female cocoons being about three inches in length and wide in proportion. The difficulty in rearing this species would, I think, be that of keeping the insect during the winter, as it hybernates in the larval state, like all species of the same genus. Besides lentisk and oak, the *otus* larva can also live on ash and cypress.

American Species.

In my various reports, English and French, I have spoken of the rearing in Europe of the principal wild silkworms of the United States of North America. With respect to the others, I shall only be able to give their names according to the list given by Aug. R. Grote, President of the Entomological Club of New York, and published in 1882.

TELEA POLYPHEMUS (*Telea*, Hübner; *polyphemus*, Cramer). The best wild silkworm of the United States, with a closed cocoon like those of the genus *Antheræa*, of which it has all the characteristics. The silk of *T. polyphemus* is white, and in quality it fully equals that of *A. pernyi*, but the cocoon is generally smaller. In Europe this species has been reared in the open air with the greatest success on oak. It is difficult to obtain the pairing of the moths in captivity, and the best thing to do is, as with *Yama-maï*, to place the cages containing the moths in the open air. *T. polyphemus* is very polyphagous, and is found on birch, beech, willow, hazel, chestnut, &c. The larva, which is one of the handsomest, has five stages. It is white in the first; in the other four stages it is of a beautiful green. The head is light brown, but it has no dots like that of *Antheræa pernyi*. The base of each tubercle is silvery white, with metallic reflection. The following are names of trees and shrubs given as food-plants of *T. polyphemus* by American entomologists:—*Quercus, Ulmus, Tilia americana, Rosa, Acer, Salix, Populus, Corylus, Betula, Vaccinium, Juglans nigra, J. cinerea, Cratægus, Quercus virens, Prunus virginiana, Platanus, Castanea vesca, Fagus, Tilia europæa, Carya tomentosa, Alnus incana,* &c.

PLATYSAMIA CECROPIA (*Attacus cecropia*, Linn.). *Platysamia* is the generic name given to this species and the three following ones, which are all closely-allied species. *P. cecropia* is the largest silk-producer in the United States. The cocoon, open like those of the same genus, is surrounded by a large irregular envelope, which is often of an extraordinary size. The larva has six stages (some authors say it has but five); is more difficult to rear in the open air in northern countries than *T. polyphemus.* It feeds on a great number of fruit and other trees, especially wild plum, willow, &c. The moths pair easily in captivity. Brodie, in 'Papilio,' February, 1883, gives a list of forty-nine species of plants belonging to the following genera:—*Tilia, Acer, Prunus, Spiræa, Cratægus, Pyrus, Amelanchier, Ribes, Sambucus, Ulmus, Quercus, Fagus, Corylus, Carpinus, Betula, Alnus, Salix,* and *Populus.* Other authors give the following genera:—*Berberis, Liriodendron, Syringa, Carya, Gleditschia, Rubus, Ceanothus, Ampelopsis, Cephalanthus, Fraxinus, Vaccinium,* and *Rosa.*

PLATYSAMIA CEANOTHI, Behr (*californica*, Gr.). A species smaller than *P. cecropia.* The envelope, which is iron-grey and pyriform, is much larger in proportion than the true cocoon inside, the space between the two being rather considerable. The larva of this species has been reared in Europe on plum and willow. Probably it would live on several of the same food-plants as *P. cecropia* and *P. gloveri.* The name of *ceanothi* is derived from one of its principal food-plants, *Ceanothus americanus.* The larva, as well as that of *P. gloveri*, is very similar to that of *P. cecropia*, especially in the first two stages. From the third stage the difference, the most striking, is that the dorsal tubercles of *ceanothi* and *gloveri* are of a uniform colour, orange-red or yellow, whilst the first four tubercles on the back of the *cecropia* larva are red, and the others yellow. The lateral tubercles are blue on the three species. The *ceanothi* moths have the background of the fore wings of a reddish brown; on the contrary, the colours vary in the other two species. The moths do not pair so easily as those of *cecropia.*

PLATYSAMIA GLOVERI, Strecker. A species which is intermediate between *P. cecropia* and *P. ceanothi* in size and colouring of the wings. The envelope of the cocoon is silvery grey; the true cocoon is dark brown. The outer envelope adheres to the cocoon, leaving no space between the two. This species was discovered in Utah, where cocoons were found on a small leaf sallow. It is also found in Arizona.

P. cecropia, P. ceanothi, and *P. gloveri,* being closely-allied species, pair readily among themselves, and very interesting hybrids have been obtained by the crossing of *cecropia* with *ceanothi* and *cecropia* and *gloveri.*

PLATYSAMIA COLUMBIA, Smith. This species, somewhat similar to *P. gloveri*, is found in various states and parts of Canada.

Callosamia promethea (*Attacus promethea*, Drury). *Callosamia* is the generic namé given by Packard. The cocoon of this species somewhat resembles that of *Attacus cynthia*, but is smaller and more elongated; the species altogether is smaller. The larva can easily be bred in the open air on lilac or cherry, if the larvæ do not hatch too late in the summer. In America the larva feeds on the *Sassafras* (wild cherry), *Cephalanthus, Laurus, Benzoin, Syringa, Berberis, Betula, Acer, Quercus, Pinus, Fagus, Liriodendron, Populus*, apple, pear, peach, &c. According to W. H. Edwards, the larva of *C. promethea* has but three moults or four stages in Western Virginia.

Callosamia angulifera, Walker. A species which is said to feed on the tulip tree; is very similar to *C. promethea*, but the colours on the wings are the same in both sexes, whilst in *promethea* they are very dissimilar.

Philosamia cynthia, Grote (*Attacus cynthia*, Drury). This is the *Attacus cynthia* mentioned before, a native of China, and now naturalised in the United States.

Attacus splendidus, B. (*Saturnia galbina; Saturnia*, Krank; *galbina*, Clem.; *Saturnia mendocino*, Behrens).

Actias luna (*Attacus luna*, Linn.). *Actias*, generic name, given by Leach. A species smaller, but resembling the *A. selene* of India. The cocoon, closed like those of the same genus, is irregular, and has but little silk. In the United States the species is double-brooded. The larva, which is green, with red tubercles, has often been reared in Europe, where it seems to prefer walnut; it is, however, very polyphagous. The food-plants mentioned by American entomologists on which the larvæ are said to be found are the following:—*Juglans cinerea, Carya porcina, Quercus, Plantanus, Liquidambar, Fagus, Betula, Salix, Ostrya virginica, Castanea*, and plum.

Hyperchiria io, Fabricius. The larva of this species forms its pupa in a light cocoon or shell on the surface of the ground; it is covered with tufts of stiff hairs, which sting like nettles. It is easy to rear in captivity. The moths, which are very handsome and differ in the sexes, pair easily. The larva, which has six stages, has been reared in Europe on oak, willow, plum, apple, &c. In America it is found on *Populus balsamifera, Ulmus, Zea mays, Cornus, Sassafras, Quercus, Robinia viscosa, Cornus florida, Liriodendron, Humulus, Gossypium, Acer, Salix, Populus tremuloides, Robinia pseudo-acacia, Cerasus virginiana, Betula, Fraxinus, Rubus villosus, Trifolium pratense*, &c.

Attacus aurota, Cramer. Large and fine species, somewhat resembling *Attacus atlas*, being sometimes called the South American *atlas*. It is found in the Guianas, other parts of Central America, and Brazil, where there is a variety bearing the name *Attacus speculifer*. The cocoon, which is very thick and rich in silk, has the same form as that of *A. atlas*. *A. aurota*, according to a former correspondent, Mr. A. Michély, who has been dead some years, has six generations each year in French Guiana. The moths emerge a month after the formation of the cocoon; the eggs hatch a week after they have been laid; and twenty days after, the formation of the cocoon takes place. This is one of the species which it would be advisable to rear on a large scale in its native country for manufacturing purposes. The silk, although rather coarse in appearance, is brilliant and abundant. *A. aurota* has been reared by Mr. Michély in French Guiana on the orange tree and on *Eucalyptus;* it can also be bred on *Ailanthus*, *Ricinus*, *Casearia ramiflora*, manioc (*Jatropha manihot*), bamboo, and other plants.

ATTACUS HESPERUS. Another species the moth of which is magnificent. The cocoon is firm, smooth, without any floss, of a dark brown, and about the size of *Attacus cynthia*, but it is more perfect in shape than *cynthia*. Mr. Michély says the larva can live on the same plants as *A. aurota*, and that it forms its cocoon fifteen days only after its hatching. There are, he says, five species of silk-producing Bombyces in Guiana.

Among other American species we must quote the following, described in the 'Transactions of the Entomological Society of London' in 1884, by Westwood (T. I., p. 38):—

SATURNIA ORIZABA, Westwood. Mexico.
S. VORULLA, Westwood. Mexico.
S. LAVENTERA, Westwood. Mexico.
S. GELLETA, Westwood. Mexico.
S. ZACATECA, Westwood. Bogota.
EUCHEIRA SOCIALIS, Westwood. Mexico.

Tudor Villa, Norbiton, Surrey.

NOTES AND OBSERVATIONS.

"APPLE TREES AND WINGLESS MOTHS."—The "case that the males *do* carry up the wingless females" (Entom. xxvi. 20) is not mine. It is that of the 'Standard' correspondent. But it had my respect from the first, for it was entirely free from hypothetical language. And I must confess that, as I go farther into it, my respect ripens into faith. Mr. Mitchell may think this a state of things with which "few practical entomologists will agree." Then let us go to the practical entomologist! Let us consult that charming book of Miss E. A. Ormerod's—a book which should be in the hands of every farmer, fruitgrower, gardener, and entomologist—'A Manual of Injurious Insects, and Methods of Prevention.' Turning to page 349, under the head of *Cheimatobia brumata*, Miss Ormerod says:—"Another point is the *transportation of the wingless female winter moths to the trees by the males* *whilst pairing.* This point was not sufficiently observed, until within the last two or three years, to be taken into practical consideration; but it bears to a very important extent on presence of attack." We may depend upon it this observation represents a consensus of opinion from practical people who have to deal seriously with insect pests, and whose knowledge of such insects is not inferior to that of the brethren of the net. Whether it refers to fruit or forest trees, of course, matters not. The "case," then, is simply this:—greased bands, properly prepared, are very effective in dealing with wingless moths, but not entirely so. Mr. Mitchell is a little hard, and too general, I think, in his criticism of "newspaper entomology." In a journal like the 'Standard,' correspondence is passed through a discriminating sieve by experts. And here is another testimonial to the press, from Miss Ormerod, It appears at page xii, in the preface to her book:—"I should fail in what is a duty as well as a pleasure if I did not mention, with many thanks, the encouragement and help ever heartily and courteously accorded to me by our agricultural, and often by our general, press."—J. Arkle; Chester.

Tortrix pyrastrana.—One day last June I bred a female of this species which I killed and pinned to a sheet of cork whereon there were a number of other insects waiting to be set. The window of my room was open; and while I was engaged setting, a male *T. pyrastrana* flew in and came towards the table, and fluttered backwards and forwards over the piece of cork, and at last settled down in the midst of the group of moths, and ran to and fro until he had discovered the dead female, whereupon he immediately attempted nuptial rites. I blew him away, but he came back again; and again I blew him away, but he persisted in returning; so I got a pill-box ready and tried to box him as he was flying round, when all at once, to my surprise, he went right into the box, and was promptly secured. It is very probable that this box had contained the female, and was therefore an attraction in itself. Eventually he joined his wished-for mate on the setting-board.—Gervase F. Mathew; H.M.S. 'Hawke,' Dec. 23rd, 1896.

Cheimatobia brumata.—As there seemed a large number of males of *C. brumata* about at the end of November, my brother and I went to search in our kitchen garden for the females. We got fifty-four in five days; so there ought to be a good many larvæ less next spring. We found the best time was between 6 and 7 o'clock. They were nearly always *in cop.*, and generally beneath the first branch. I do not think the males carry up the females, as on two or three occasions we saw the male fly away after copulation; the female then ran up the tree some way, remained still, but we never saw any laying eggs. They varied very much both in size and colour, some being quite black.—H. M. Edelsten; The Elms, Forty Hill, Enfield, N., Jan. 1st.

High-flat Setting.—What should they know of England who only England know? May I be allowed to prolong the discussion on high setting of Lepidoptera? It is a question which affects me more than most of your correspondents. Mr. Sabine writes (Entom. xxix. 359), "It seems to me that we collectors of British insects are desired to set our specimens flat, simply for the benefit or convenience of those who go in for foreign insects as well." This is correct, but the inconvenience to the collector of extra-British insects under the present system is so great that it is hardly right to pass over it as unworthy of attention. I have for many years collected British and foreign insects. As it is impossible, without exchanging (or buying) specimens, to obtain anything like a good collection, I naturally resort to exchange on a fairly large scale. What is the result? My collection is a heterogeneous mixture of high, medium, and low-set specimens, with wings curved or flat, sloping up or down or arranged horizontally. Short of resetting everything this is unavoidable. Now, if it be Mr. Sabine's intention (and that of those who argue with him) to discourage the collection of any but British Lepidoptera, he is undoubtedly right. But does he realise that the excellent work done in Britain, by the comparison of local varieties with one another, is but half complete if they are not compared with the continental forms of the same insects? We are blessed with such a wide variety of climate and weather in our happy isles, that a very large range of variety, in many species, may be found without crossing the Channel; but why throw obstacles in the way of those who would complete the series by adding, say, polar or southern forms of the same species? It is immaterial, in my opinion, whether entomologists set insects high or low; both ways have advantages; high-set are safer to pack for posting, and extremely convenient for putting locality and other labels beneath. Personally, though I admire a well-set English specimen, curved wings are to me the *ne plus ultra* of artificiality; it is, however, very material that lepidopterists all the world over should adopt a uniform system; and as we are hardly likely to convert the rest of Europe, America, the colonies, in fact all the world, except our own little islands, to our method of setting, the sooner we abandon it for the universal one the better. As to English setting being the "hall-mark" of a British insect, if the hall-mark is not written on the insect by Nature's hand it is not worth much, except perhaps from a pecuniary point of view. If an English specimen differs in any way from a foreign one, the hall-mark is not needed; if it does not so differ, a locality label meets the purpose equally well. As Mr. Jacoby points out, setting is no guarantee against fraud. One distinct and immediate advantage of uniform setting would be the greater ease with which good specimens which are common abroad (*Cinxia*, for instance) could be obtained, which would help to save many of our rarities from extinction. In conclusion, let me state that I am not arguing on the merits of the two opposing systems of setting, as I have, alas! hundreds of both in my collection, but simply on the advisability of the general adoption of the uniform system obtaining all over the world. The following are the advantages I claim:—It would facilitate foreign exchange, and increase the knowledge of the distribution of British species outside Britain, if not of extra-British species. It would give greater facilities for the determination of new British species, the guesswork handling of which at present is rather woeful. It would give collectors of Europeans fair play, both in regard to the beauty of their collections and in exchange abroad (the continental collector objects to English-set specimens as much as the hardened Britisher to high-set ones). It would bring us in line in this matter with the rest of the civilized world. Foreign setting-boards generally slope a trifle *upwards*.—J. C. WARBURG; Cannes.

THALPOCHARES PAULA, Hb., IN BRITAIN.—Mr. C. W. Dale asks (*ante*, p. 17) whether this species is British, and since I can answer his question in the affirmative, and am the owner of the specimen to which he alludes as having stood as *T. paula* in Mr. C. A. Briggs's collection, I am writing these lines to dispel his doubts. The moth referred to is unquestionably *T. paula;* and although Mr. Dale says "it is certainly very different to any foreign specimens of *T. paula* which I have seen," and "it far more resembles foreign specimens of *T. parva*," I can assure him that it agrees absolutely with all the British and continental examples of *T. paula*, and differs essentially from those of *T. parva* which I have examined. It is the actual specimen captured by Mr. J. Moore, at Freshwater, Isle of Wight, in June, 1872, and alluded to by Mr. Barrett in Ent. Mo. Mag. x. 19 (Mr. Dale by a slip gives the reference as "ix. 19"), and by Dr. H. G. Knaggs in Ent. Ann. 1874, p. 156. Mr. Moore, whose initials Mr. Barrett (*loc. cit.*) gives as "E. G." in mistake for "J.," was personally known to the late Mr. Howard Vaughan and to Mr. C. A. Briggs, and was thoroughly reliable, though I believe that his name was, in later years, used for fraudulent purposes by unscrupulous dealers. Besides this specimen Mr. Barrett (*l. c.*) mentions two other *T. paula*, which I have also seen; the history of one is unknown, but there is every reason to believe that the other was taken on the south coast by a schoolboy years ago. There may be one or two other genuine British specimens in this country, but I have no particulars of their capture at hand. Mr. Dale evidently thinks that Messrs. Barrett and Meyrick have applied the names "*parva*" and "*paula*" to different species; but a careful comparison of their descriptions to which he refers, as well of those of Dr. Knaggs in Ent. Ann. 1874, pp. 157–8, with authentic examples of both insects, shows clearly that all three authors have applied the names quite correctly and to the same species, and that the supposed discrepancies arise from his having failed to notice that whereas Mr. Barrett's distinctions are based on the character of the *fasciæ*, Mr. Meyrick's rest upon the character of the *lines*. Some of the differences between *T. parva* and *T. paula* are well pointed out by Dr. H. G. Knaggs in Ent. Ann. 1874, pp. 157–8; and a good enlarged coloured figure of the former, of which I myself captured a specimen in this district on June 8th, 1892 (Ent. Mo. Mag. Ser. 2, iii. 308), will be found on the frontispiece in Ent. Ann. 1859, though Newman ('British Moths,' p. 448) makes the extraordinary comment that from the figure he "should have supposed this insect to be the female of *ostrina!*" I would strongly advise Mr. Dale to examine the very long and beautiful series of *T. parva* and *T. paula* in the general collection at the British Museum (Natural History), as they will show him well the peculiar characteristics of each species: the majority of the specimens came out of the collections of the late Professors Zeller and Frey, whose ideas as to the correct application of the names agreed precisely with those of Messrs. Barrett, Knaggs, Meyrick, and myself. In support of his suggestion that *T. paula* is not British, Mr. Dale, following

Mr. Barrett (Ent. Mo. Mag. x. 20), says that the larva feeds on *Gnaphalium arenarium*, which is not a British plant; but it is also known to feed on other species of *Gnaphalium*, and several occur in this country. In any case, however, I regard *T. paula*, *T. parva*, *T. ostrina*, and certain other insects in the British list, as merely accidental visitors, which at best can only continue their race in this climate for a few months, and are quite unable in any stage to survive our winters. — Eustace R. Bankes; The Rectory, Corfe Castle, January 1st. 1897.

CAPTURES AND FIELD REPORTS.

Vanessa antiopa at Gorleston, near Great Yarmouth.—I saw a specimen of *Euvanessa* [*Vanessa*] *antiopa* on Sept. 8th, when walking on the pier on the Gorleston side of Yarmouth harbour-mouth. I did not attempt to catch it, as I do not believe in capturing every rare butterfly as soon as it is espied, especially when one is sure of its identity; but I got quite near to it, and could plainly see it had the yellow border of the continental form, whence I infer it had come across lodged on the rigging of some ship.—Albert H. Waters, B.A.; Cambridge.

Moths taken at Electric Light, Ealing. — The following list testifies to the fact of an erroneous belief among my friends here, whose assertion is that this vicinity, in such near proximity to London, generally rewarded the entomologist with few and unimportant captures. I merely tried this place as an experiment, on July 5th and August 3rd and 20th respectively, which yielded contrary results:—*Smerinthus populi*, *S. tiliæ*, *Zeuzera æsculi* (male and female), *Cossus ligniperda* (in good condition), *Arctia caia*, *Spilosoma fuliginosa* (one dark variety), *S. menthastri*, *S. lubricipeda*, *Liparis chrysorrhœa*, *L. salicis*, *Orgyia antiqua*, *Lasiocampa quercifolia*, *Pterostoma palpina*, *Notodonta dictæa*, *Phalera bucephala*, *Drepana hamula*, *Bryophila perla* (on the under surface of this moth's wings a number of small red parasites adhered to the costa), *Acronycta tridens*, *A. psi*, *A. aceris*, *A. megacephala* (the last very numerous), *Leucania lithargyria*, *L. pallens*, *L. comma*, *Tapinostola fulva*, *Axylia putris*, *Hydrœcia nictitans*, *H. micacea*, *Xylophasia lithoxylea*, *X. polyodon* (it could be seen how plentiful this moth had been by the wings, the remainder having been eaten by the bats), *Neuria saponariæ*, *Neuronia popularis*, *Luperina testacea* (on the posts), *Mamestra anceps*, *M persicariæ*, *Dicranura vinula*, *Apamea oculea* (plentiful), *Miana fasciuncula*, *Agrotis puta*, *A. exclamationis* (one variety having the dark markings totally obliterated), *Triphæna pronuba* (many rufous and light varieties), *Noctua c-nigrum*, *N. xanthographa*, *Calymnia trapezina*, *Hecatera dysodea*. *Phlogophora meticulosa* (scarcer than last year), *Hadena oleracea*, *Cucullia umbratica*, *Plusia chrysitis*, *P. gamma*, *P. iota*, *Amphipyra tragopogonis*. *Catocala nupta* (in good numbers), *Mania typica Epione apiciaria*, *Rumia cratægata*, *Uropteryx sambucata* (plentiful, one I took having the hind wings aberrant), *Eugonia fuscantaria*. *E. angularia*, *Amphidasys betularia* (a dark form), *Boarmia rhomboidaria* (common), *Pelurga comitata*, *Hemithea thymiaria*, *Eupithecia subfulvata*, *E. centaureata*, *Timandra amataria*, *Melanippe fluctuata*, *Melanthia ocellata*. The Pyralides were fairly represented.—H. W. Bell-Marley; Ravenscourt Park, Sept. 5th, 1896.

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ABERRATIONS OF *EPINEPHELE HYPERANTHUS.*

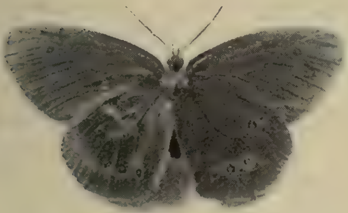

FIG. 1.

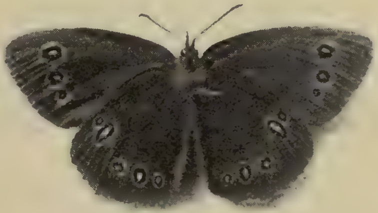

FIG. 2.

THE first specimen is interesting, as it shows considerable bilateral asymmetry in the markings of the hind wings, the left wing being normal and the right curiously blotched; but the most interesting point seems to me to be the fact that the aberration in the ocellar marks is entirely confined to the black and yellow zones, the central white pupils being in each case quite normal in position and, except in the ocellus next to the anterior margin, of the normal size. This is of course contrary to the general rule enunciated by Bateson and others, that "speaking generally, such reduction commonly occurs by diminution of the diameter of the whole spot; but if any of its component parts are wanting the *centre* is the first to disappear, then the next innermost band, and so on."* Bateson himself, however, points out that the rule is not a universal one, and in fact in *E. hyperanthus*, as far as I can judge, from the specimens I have seen in which the ocelli on all the wings are hardly recognisable var. *arete*, it is the central white pupil that persists and the marginal zones that disappear, although where one ocellus disappears at the end of a series the rule generally holds good.

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* Bateson, 'Materials for Study of Variation,' p. 291.

The specimen, fig. 1, seems to be a case of discontinuous variation. I have never seen anything approximating to an intermediate condition betweon it and the normal, and, judging from the fact that it is confined to one side, and that the wing showing the aberration is slightly crippled, it would appear to be due to some cause at work during pupal life, and in such a case it would probably not be hereditary. In one sense it may be regarded as an instance of ocellar *enlargement*, since the marginal zones of four of the ocelli extend so far over the surface of the wing as to blend into one another, almost forming transverse bands across the wings; and it is noteworthy that in all the ordinary varieties of *E. hyperanthus* in which the ocellus is enlarged, that I have come across, the central pupil is enlarged more or less in proportion to the enlargement of the marginal zones, as is very well shown in the lanceolate variety, fig. 2; and in such cases a practically complete series of intermediate forms is obtainable with little difficulty. It may be worth noting that the neuration is apparently quite normal in both cases.

My thanks are due to my friend Mr. Hayward for the care and skill he has displayed in photographing the specimens for me.

F. P. Bedford.

FUNGI *versus* ANDROCONIA.

Referring to Mr. Rickard's paper on "Butterfly Scales," in the January (1897) number of the 'Entomologist' (*ante*, p. 1), I would like to refer him to a paper just published at Cambridge, Mass., by A. G. Mayer, as a bulletin of the Museum of Comparative Zoology, on "The Development of the Wing-scales and their Pigment in Butterflies and Moths." I think he will find on close examination that by his test all the wing-scales are really fungi. I have requested that a copy of the paper be sent to the 'Entomologist,' and have no doubt that Mr. Rickard can secure it for examination and study. It seems to me that the proper method of bringing this whole subject to a final conclusion would be for Mr. Rickard, or some one who agrees with his views in the matter, to study the development of these scales in *Pieris rapæ* in the same manner in which Mr. Mayer has studied the development of the normal wing-scales. I must confess that nothing that has been added in the most recent contribution to this subject has served to change my expressed views.

John B. Smith.

Rutgers College, Jan. 13th, 1897.

THE PROBABLE CHEMICAL AND PHYSICAL NATURE OF THE PIGMENTS OF LEPIDOPTERA.*

ONLY a beginning has, as yet, been made in the study of the nature of the pigment substances that are found within the scales of Lepidoptera. Coste † and Urech ‡ have carried out extensive series of experiments which show that many of the pigment substances may be dissolved out of the scales by means of chemical reagents, giving coloured solutions, and leaving the scales white or colourless. They have also shown that some of these pigments may be changed in colour by the action of reagents, and then restored to their original colour by the use of other reagents, For example, many reds are changed to yellow by the action of HCl or HNO_3, and may be restored to the original red colour by the use of ammonia. Their researches show that reds, yellows, browns, and blacks are always due to pigments. In a few cases, greens, blues, violets, purples, and whites are also due to pigments, and not, as is usually the case, to structural conditions, such as striæ upon the scales, &c.

It is probable that the most universal pigment colours to be met with in the Lepidoptera are the yellowish buff and brown-drab tints, and this is especially true of the nocturnal forms. The diurnal forms have almost a monopoly of the brilliant reds and yellows and the rich blacks, but it is interesting to note that yellowish buff or brown tints are still very common upon those portions of their wings that are hidden from the light, such as the upper costal edge of the hind wing, which is usually concealed from view beneath the overlapping fore wing. Wallace § has called attention to the fact that a yellowish or buff tint is one of the commonest and most widespread colours in Lepidoptera.

Concerning the chemical nature of the pigment substances within the scales, but little has as yet been made known. Hopkins ‖ finds that the white pigments in the Pieridæ are due

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[*] Excerpt from "The Development of the Wing-Scales and their Pigment in Butterflies and Moths." By Alfred Goldsborough Mayer. ('Bulletin of the Museum of Comparative Zoology at Harvard College,' vol. xxix., No. 5). 1896.

[†] "Contributions to the Chemistry of Insect Colours" 'The Entomologist,' vol. xxiii. pp. 128–132, 155–167, 181–187, 217–223, 247–252, 283–287, 309–314, 338–343, 370–374 (1890), and vol. xxiv. pp. 9–15, &c.). 1890–91.

[‡] "Beiträge zur Kenntnis der Farbe von Insektenschuppen" (Zeitschr. f. wiss. Zool. Bd. lvii. Heft 2, pp. 306–384). 1893–94.

[§] 'Darwinism.' 494 pp. London and New York. 1889.

[‖] "Uric Acid Derivatives functioning as Pigments in Butterflies" (Abstr. of Proc. Chem. Soc. Lond. 1889, p. 117; also 'Nature,' vol. xl. p. 335). 1889. —"Pigment in Yellow Butterflies" ('Nature,' vol. xlv. p. 197). 1891.— "The Pigments of the Pieridæ" (Proc. Roy. Soc. Lond. vol. lvii. No. 340, pp. 5, 6). 1894.

to uric acid, and also that the red and yellow pigments are due to two closely related derivatives of uric acid. These uric acid derivatives used in ornamentation are apparently confined to the Pieridæ among butterflies. For when a pierid mimics an insect of another family, the pigments in the two cases are chemically quite distinct. This is well seen in the genera *Leptalis* (Pieridæ) and *Mechanitis* (Danaidæ).

Further, Griffiths * has shown that the green pigment found in several species of *Papilio*, *Hesperia*, and *Limenitis* among butterflies, and of Noctuidæ, Geometridæ, and Sphingidæ among moths, also consists of a derivative of uric acid, to which he gives the name "lepidopteric" acid, and assigns the empirical formula $C_{11}H_{10}Az\ N_8O_{10}$. By prolonged boiling in HCl it is converted into uric acid.

Urech † demonstrated that in a large number of Lepidoptera the colour of the urine that is voided upon emergence from the chrysalis is similar to the principal colour of the scales.

Landois ‡ many years ago made a careful study of the constitution of the blood of several species of beetles and butterflies. He found that when the blood is allowed to evaporate in the air, crystals separate out. He also found that the blood consists chiefly of egg albumen, but that globulin, fibrin, and iron are also present. He called attention to the fact that the freshly drawn blood of the larvæ of Lepidoptera is usually light in colour, but that when it is allowed to dry in the air it generally becomes brownish or yellowish; and further, that while the colours of the bloods are different for different species, it is very remarkable that the colour which is assumed by the *dried* blood is apt to be similar to the ground colour of the wings of the mature insect from which the blood is drawn.

As before stated, I believe that the pigments of the scales are derived from the hæmolymph or blood of the chrysalis, and my chief reason for believing this is that I can find no evidence that there is anything but hæmolymph within the scales during the time when the pigment is formed. In considering the phenomena of pigmentation, therefore, it is important to know as much as possible about the physical and chemical properties of the hæmolymph of the pupa. Accordingly, I have devoted some time to the study of the properties of the pupal hæmolymph of the large Saturnidæ, *Samia cecropia*, *Callosamia promethea*, and *Philosamia cynthia*. The hæmolymph is under considerable

* "Recherches sur les Couleurs de quelques Insectes" ('Comptes Rendus,' Acad. Sci. Paris, tome cxv. pp. 958, 959). 1892.

† "Beobachtungen über die verschiedenen Schuppenfarben und die zeitliche Succession ihres Auftretens" (Zoolog. Anzeiger, Bd. xiv. pp. 466–473). 1891.

‡ "Beobachtungen über das Blut der Insecten" (Zeitschr. f. wiss. Zool. Bd. xiv. pp. 55–70, Taf. vii.–ix.). 1864.

pressure in the chrysalis, and when an incision is made near the shoulders of the wing cases it spurts out in large drops. I have made a chemical analysis of it, and find that its chief constituent is egg albumen, but that globulin and fibrin are also present. When the hæmolymph is agitated with ether, the proteid substances are coagulated, and a clear amber-yellow solution is left. This amber-yellow solution may then be decanted off from the congealed proteids. When thus isolated the proteids are slightly yellowish, but they soon dry into a drab-coloured mass, very much as the hæmolymph itself does upon exposure to the air. Spectrum analysis shows that the clear amber-yellow solution owes its yellow colour to xanthophyll. It will be remembered that Poulton* found that the green and yellow colours of many lepidopterous larvæ and pupæ were due to chlorophyll and xanthophyll derived from the leaves of their food-plants. The hæmolymph is acid to litmus, and I find that it actually contains a large amount of orthophosphoric acid (ammonium molybdate test). Mr. George Oenslager has kindly determined the mineral bases of the hæmolymph for me, and finds them to be iron, potassium, and sodium. The iron is present in considerable quantity.

Although the freshly obtained hæmolymph is a clear opalescent amber-yellow fluid, it soon becomes turbid upon exposure to the air, and in less than half an hour after removal from the chrysalis becomes opaque, and drab or greenish drab in colour. It is interesting to note that the drab colour assumed by the dried hæmolymph from the pupa of *C. promethea* is very similar to the drab of the outer edges of the mature wings. In the case of *P. cynthia*, also, the hæmolymph dries into a greenish drab colour, which is strikingly similar to the principal colour of the moth's wings. In the case of *S. cecropia*, however, the hæmolymph becomes rather greener in colour than the drab of the mature wings.

This curious change in colour which the hæmolymph exhibits upon exposure to the air is probably not a simple process of oxidation, for it will take place in an atmosphere of hydrogen, although rather more slowly than in the air. An atmosphere of CO_2, however, practically prevents it, for after remaining for forty-eight hours in this gas, the hæmolymph shows only faint traces of a drab-coloured clot around the edges of the liquid, which remains clear and amber-yellow in colour. If the hæmolymph be sealed up air-tight in glass tubes it will retain its clear amber-yellow colour indefinitely. When the newly extracted clear amber-coloured hæmolymph is heated to 54° C., it begins to congeal, and at temperatures above 63° C., it rapidly solidifies into a chrome-yellow-coloured mass. In this condition it will keep indefinitely, always retaining its original chrome-yellow colour. In like manner congelation can be produced in hæmolymph that has become drab by exposure to the air, only in this case the congealed mass is drab, not chrome-yellow in colour.

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* "The Essential Nature of the Colouring of Phytophagous Larvæ and their Pupæ, &c." (Proc. Roy. Soc. Lond. vol. xxxviii. pp. 269–315). 1884–85.

If, in accordance with my hypothesis, it be true that the colours of the mature wing are derived, by various chemical processes, from the hæmolymph of the pupa, then one ought to be able to manufacture various colours from the hæmolymph by means of chemical reagents. Also, if the colour so manufactured be similar to some colour upon the mature wing, it may be expected to present reactions to chemical reagents similar to those of the colour on the wing. As far as my rather limited experiments go, I find this to be the case. For example, if one treat the hæmolymph of *S. cecropia* with warm concentrated HNO_3, it congeals into a deep chrome-yellow mass. If now ammonia be added in excess, it changes to a reddish orange, which is very similar in colour to the reddish orange band that crosses the upper surface of the hind wings of the moth. Now this reddish orange band of the moth is changed to chrome-yellow by HCl or HNO_3, and then, if ammonia be added, the original red colour reappears; this alternation of red and yellow may be produced indefinitely by the successive additions of ammonia and acid. Exactly the same sequence of reactions is produced with the red pigment derived from the hæmolymph; HCl or HNO_3, causes it to become chrome-yellow, and then ammonia restores the original red colour.

Another confirmatory test of a similar nature may be performed as follows: A portion of the drab-coloured outer edge of the wing of *S. cecropia* is treated with warm HNO_3 and the acid evaporated off at a gentle heat. By this means the pigment of the scales is changed to a deep chrome-yellow; if ammonia be then added, it becomes reddish. Very similar reactions are obtained from the hæmolymph after it has congealed, in the air, into a greenish drab mass.

Another experiment which I have tried is the following:— The freshly drawn hæmolymph from a pupa of *C. promethea* is congealed by heat into a chrome-yellow-coloured mass, then HCl_3 and a small crystal of $KClO_3$ are added, and the acid is evaporated off at a gentle heat. By this means a purple mass is produced, which is changed to drab by HNO_3. The purple spots near the outer edges of the hind wing of the female moth are also changed to drab by HNO_3.

Still another confirmatory experiment may be given. The drab hæmolpymh of *C. promethea* is dissolved and changed to a sepia-brown colour by warm HCl, to which a crystal of $KClO_3$ is added. An exactly similar change occurs when the drab-coloured outer edges of the moth's wings are treated in a similar manner.

It is well known that the most universal colours of the more lowly organized moths are the drab-grey and yellow-drab tints; and this is what one would expect according to my hypothesis, for these are the colours that are derived from the hæmolymphs by mere exposure to the air. Ths brilliant yellows, reds, &c., are the result of more or less complex chemical processes, which have been slowly effected, probably through the agency of natural selection.

In connection with the phenomena of pigmentation it is interesting to note that while uric acid may easily be demonstrated by the murexide test in the fluids of the alimentary tract of the *pupæ* of the Saturnidæ, it is never present in the hæmolymph of the *imago;* nor can I detect it in the drab-coloured pigment of the outer edges of the wings. The amount of uric acid in the fluids of the alimentary tract of the pupa increases as the pupa becomes older, so that the fluid which is voided upon emergence is always strongly impregnated with it. In the case of *Pieris rapæ* there is no uric acid either in the alimentary tract or hæmolymph of the larva, but it is present in the *alimentary tract* of the pupa. It seems to me probable that the uric acid of the alimentary tract of the pupa may be a product of the metabolism of the hæmolymph that is removed from the fluids of the body by the Malpighian tubules.

THE PROBABLE CAUSES OF THE DECADENCE OF BRITISH RHOPALOCERA.

By W. Harcourt-Bath.

At the meeting of the Entomological Society of London when this subject was brought forward for discussion, judging from the report which is published in the 'Proceedings,' one cannot avoid being considerably struck with the almost total absence of any suggestions advanced by the speakers from a purely evolutionary point of view. One must, therefore, accordingly draw the conclusion that the principles and theories propounded by that great naturalist the late Charles Darwin, and his able successor Dr. Alfred Russel Wallace, have not succeeded in obtaining many adherents among the Fellows of the learned Society under consideration. The chief factors in deciding the decadence of British Rhopalocera, which the majority of those who spoke at the meeting seemed to consider, were adverse climatic influences, and no suggestions or hints were thrown out whatever in support of the hypothesis of the organic environment possessing a preponderating influence in the determination.

With due respect to the learning and reputation of some of those who gave expression to their views upon the above-mentioned occasion, permit me to say that personally I consider the climatal conditions to have played quite a subordinate part in causing the decadence of the indigenous insects under discussion.

From the point of view of an orthodox evolutionist of the natural selection school, the primary factors in the matter, to my mind, are insular isolation coupled with the consequent concomitant powerful operation of the law of amixia. This hypothesis is supported by the fact that nearly all the species which have been extirpated or are at present on the point of extermination possess comparatively weak powers of flight, at the same time they do not contain in their ranks any species with a very pronounced predilection for migrating. At any rate, they all belong to that class which are not known to immigrate periodically to this country from the Continent. On the other hand, many of those species which maintain their existence perennially in these inhospitable isles are frequently known to come across the English Channel, occasionally in large swarms, such for instance as *Pieris brassicæ*, *P. rapæ*, *P. napi*, and *Vanessa atalanta;* while others, such as *Vanessa cardui* and *Colias hyale*, would not probably permanently occur in this country for more than a few years at the most, were it not for these remarkable peregrinating powers which they possess.

This isolation from the Continent is therefore, in my opinion, the primary cause of the decadence phenomenon under discussion, and the law of amixia comes into operation as a necessary consequence. As a rule all those species which subject themselves to its despotic influence, namely, the prevention of crossing by isolation, have as a result the degeneration of their physical powers, their fecundity undergoes a deterioration, the number of ova which they produce is thus probably considerably below the average, and the offspring at the same time do not possess sufficient of the necessary vitality and vigour to enable them to contend successfully with the numerous enemies by which they are surrounded.

Another very probable cause of the gradual extinction of some of our indigenous Rhopalocera is to be found in the increasing number of their enemies which subsist exclusively upon insects for food. Contrary to that which is the case in most parts of the Continent (at least according to my circumscribed experience), the number of individuals of insectivorous birds in this country is exceedingly great. This has been brought about both by reason of their legislative protection and the merciless war waged by gamekeepers against the hawks and owls which prey upon them. At the same time, from the latter cause also, the number of insectivorous animals (*Talpa* and

Sorex, &c.), as well as batrachians and certain reptiles, have probably undergone an increase, these creatures largely constituting the food of several members of the rapacious family of *Accipitres* alluded to, as is well known to those of the ornithological fraternity. When the balance of nature is thus so completely upset, something must suffer as a direct result thereof; and this in my idea accounts in a large degree for the growing scarcity and looming final extinction of several members of our already too poor Rhopalocera fauna.

In support of this contention may be mentioned the fact that in France insects of all orders have undergone an increase since the fashion came into force for small birds to be utilised for millinery purposes, in conjunction with the demand for them as articles of food. This has resulted in the extirpation of nearly all the small birds in the country named, the consequence of which has been for several years past the dreadful destruction of the crops by the undue multiplication of the insect hordes.

As regards the adverse influences of the climatal conditions, these in my estimation, as previously stated, play quite a subordinate part in the matter, and probably only act indirectly, at least in the majority of instances. They are possibly usually more apparent than real. When, however, a species has been so reduced by the operation of the aforesaid law of amixia, combinéd with the inimical influences of the organic environment in the manner I have indicated, I am quite willing to concede that the climatal conditions, such as a succession of wet summers or a continuance of mild winters, sometimes successfully closes the chapter. Other adverse influences may be at work at the same time, such as the extirpation of their pabula by drainage and conflagration, and the extension of cultivation, as well as in several other ways which have from time to time been adduced. All these are silently but as surely assisting the adverse influences of the organic environment in their fatal task of extermination.

Rapacious collectors are undoubtedly responsible for the existing scarcity of several species in certain localities, two instances of which have come under my own knowledge during the last summer. A resident collector at Arley, in Staffordshire, informs me that *Melitæa aurinia* used to occur in abundance on the opposite side of the Severn before several members of a certain Society recently succeeded in reducing it to the brink of extermination by collecting all the larvæ and imagines which they could meet with for several seasons in succession. Another instance was related to me in connection with *Lycæna arion* in the Cotswolds by an Oxford Don, who attributes the entire extirpation of this butterfly, in one of its very best stations in the district named, to the rapacity of a particular individual "who scraped up about a bushel of its pabulum" in the hope of being able to procure the larvæ; since which date it has entirely disappeared.

Leucophasia sinapis is also rapidly approaching extermination in the Midlands, owing to the greediness of collectors.

Before concluding I will endeavour to furnish a few suggestions as to the best means which I consider can be adopted in order to counteract, if possible, the lamentable state of things which constitutes the subject of these remarks.

Assuming that the effects of amixia are primarily responsible for the decadence of the butterflies, the best thing under the circumstances would probably be to infuse "fresh blood"—if I may be permitted to employ a metaphorical expression—into those colonies which still exist, in the same way as has been suggested in order to save the few remaining herds of the European bison which still survive in the wilds of Lithuania and the Caucasus. Could not a few males or females of certain declining species be brought over from the Continent and permitted to fly in some of the well-known haunts, for instance, of *Lycæna arion*, *Melitæa cinxia*, &c.? At any rate the experiment might be given a fair trial during some favourable season.

As regards endeavouring either to prevent or persuade the majority of colleciors in this country from taking long series of rare species bordering upon extinction, whenever they have the opportunity, all such efforts I think must prove futile. The acquisitive instinct of the average British collector is too overpowering to induce him to withstand the temptation.

Moreover, do all the principal entomologists and collectors themselves in the Metropolitan Society set a proper example in this respect? Judging from the accounts of the public sales which periodically take place under the hammer, I should venture to suggest that such is not the case with very many of them.

If something could be done to discourage the ravages of omnivorous and indiscriminate unscientific collectors and rapacious dealers, some good results would undoubtedly accrue.

Birmingham, Nov. 14th, 1896.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 39.)

Eugonia alniaria, *L.*—Restricted in distribution, but locally abundant. I have never met with it. Kildare, Hon. Emily Lawless (E. M. M. iv. 283); Cromlyn, Co. Westmeath (*Mrs. B.*); Enniskillen (*S.*); Greystones, Co. Wicklow (*Wynne*); Clonbrock (*R. E. D.*).

Eugonia fuscantaria, *Haw.*—I have never met with this species, and record it doubtfully, as the var. *infuscata* of *E. quercinaria* is easily confounded with it. The only two records are Clonbrock (*R. E. D.*), and at Mallow Mr. Francis Stawell writes that it is fairly abundant.

Eugonia erosaria, *Bork.*—Very rare. Cork and Derry (*B.*); one at Howth, Co. Dublin; four at Clonbrock (*R. E. D.*).

Eugonia quercinaria, *Hufn.*—Common in many places (*B.*), but restricted to locality. Near Derry (*C.*); Hazlewood, Co. Sligo; Mote Park, Roscommon; Clonbrock. The var. *infuscata* usually occurs with the type.

Himera pennaria, *L.*—Appears to be local, but numerous in some wooded districts. Mr. Birchall took it abundantly, but has not recorded the localities. Killarney; Clonbrock, by Mr. Dillon and myself; Markree Castle, Sligo; Cromlyn, Co. Westmeath (*Mrs. B.*); near Derry, a few (*C.*); Armagh (*J.*); Ballygawley and Favour Royal, Tyrone; Carrickmines, &c., Co. Dublin; Devil's Glen, Co. Wicklow.

Phigalia pedaria, *Fb.*—Decidedly scarce in Ireland, though widely distributed. Belfast is the only district whence it is reported (by Mr. Watts) as frequent; and the type there is large and pale, with distinct markings. The Rev. James Bristow also reports it thence from Colin Glen. Examples have been taken at the following localities: near Derry (*W. E. H.*); Sligo (*R.*); Clonbrock (*R. E. D.*) and near Galway (*A.*); Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Westmeath; Tullamore, King's Co.; Armagh (*J.*); Phœnix Park and elsewhere in Co. Dublin.

Nyssia zonaria, *Schiff.*—Mr. Campbell, of Derry, was the first to discover an Irish habitat for this species, having taken the larvæ several years ago at Ballycastle, Co. Antrim, some of which were forwarded to me for identification. The imago was subsequently captured freely by Mr. Bristow and others. An example has also been forwarded to the Dublin Natural History Museum by Mr. Sheridan, the intelligent proprietor of the hotel, Achill I., off the coast of Mayo. In 1896 Mr. Halbert, of the Dublin Museum, Mr. Dillon, and myself took a good many specimens near Slyne Head and at Roundstone on the Connemara coast. It seems probable in view of the wide separation of these localities that most of the numerous sandhills which extend along the Mayo and Connemara littoral will be found to harbour colonies of this species. Mr. Dillon contributes a remarkable record (Ent. xxvii. 190) of the occurrence of larvæ at Clonbrock in the same county, but some thirty miles inland, from which he had bred a female on August 19th, 1891, which, when taken to the locality frequented by the larvæ, attracted a wild male. The only note of an autumnal season of emergence, either Continental or British, that I can find, is in Merrin's 'Calendar,' which gives September, as well as the early spring months. Neither has the insect been found heretofore inland, except on the Continent, where it haunts bare places and clearings of woods in certain localities of Central France and elsewhere in April. There is considerable variation noticeable among the Irish specimens, chiefly with regard to the basal two-thirds of the male fore wing up to the first white bar. On the dark ground in some examples there are distinct white dashes, a pair at the base, two pairs in the median area, and three separate ones towards the apex. These vary greatly in size and definition, and in some Ballycastle specimens are quite absent, producing an approximation to the coloration of its congener *N. hispidaria.* On the other hand, a considerable proportion of those from Connemara have the wing entirely white, broken by dark nervures, and costa, and three strigæ parallel to the outer margin.

Biston hirtaria, *Clerck.*—Very local, and apparently never numerous. Specimens have occurred at Wicklow (*B.*); Farnham; Cavan; Hollybrook, Co. Sligo (*Miss ff.*); Killynon, Westmeath (*Miss R.*); and a few at Clonbrock (*R. E. D.*), Co. Galway.

Amphidasys strataria, *Hufn.*—Birchall records this from Wicklow (probably captured by Mr. Tardy); and this has since been confirmed by Mr. Maurice Fitzgibbon at Wooden Bridge and Professor Hart, who bred several from pupæ taken at Glenmalure. It is also fairly abundant at Clonbrock, whence I have a nice series of the ordinary, somewhat variable forms. Mr. Francis Stawell has taken it at Mallow, Co. Cork.

Amphidasys betularia, *L.*—Widely distributed, and often abundant in the larval stage. I have seen no remarkable variations from any Irish localities, except in a series bred by Mr. Thornhill, of Castle Bellingham, Co. Louth, from local larvæ. Of these the greater proportion are of the normal type, but among them is one specimen of var. *doubledayaria,* and several showing a tendency to the development of the black spots; one especially having large black costal blotches, which run into a series of spots, forming irregular transverse bands; the outer marginal area being also heavily blotched. Another is strongly powdered with black on the basal and costal areas. This is a very notable instance of the sporadic appearance of a melanic tendency in this species, and it will be interesting to observe whether the dark aberrations increase and supplant the type more or less in an Irish country district whose atmosphere is untainted by manufactory smoke, and not remarkable for any abnormal rainfall. The moth has been taken also in the following localities: Kingstown and elsewhere in the Co. Dublin;

Wicklow; Clonbulloge, King's Co. (*E. S.*); Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Westmeath; Enniskillen; near Derry (*W. E. H. & C.*); Hollybrook (*Miss ff.*); Markree Castle and about Sligo; Clonbrock (*R. E. D.*); Moycullen, Ardrahan (*Miss N.*), and Galway (*A.*); on the shores of L. Conn, Co. Mayo; Doneraile, Co. Cork (*Stawell*); Killarney and Kenmare.

CLEORA LICHENARIA, *Hufn.*—Widely distributed, and locally common. Varies considerably, but the darker forms are scarce. Co. Dublin and Lambay I.; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Co. Westmeath; Enniskillen and Tempo (*Langham*), Co. Fermanagh; Trillick, Co. Tyrone; Drumreaske, Co. Monaghan; Armagh (*J.*); Rathmullen, Co. Donegal (*C.*); Markree Castle and near Sligo (*R.*); Clonbrock, Co. Galway (*R. E. D.*); Shannon Harbour, King's Co.; Kenmare and Killarney; Kerry; Mallow (*Stawell*) and Glandore (*D.*), Co. Cork; Cappagh, Co. Waterford.

BOARMIA REPANDATA, *L.*—Everywhere numerous. Very variable; but a comparison of a large number of Irish specimens with an English series shows that the general ground colour is far lighter in the former. The prevailing Irish form is of a pale ferruginous brown, with indistinct and blurred design. This is common in Norway also. Occasionally there occur mottled forms, with strongly-marked strigæ, like the illustration in Newman, on a greyish or ferruginous ground; but I have seen none of these with rich dark brown ground, not uncommon in England. These strongly-marked forms are found at Killarney, Kenmare, and rarely at Mote Park, Roscommon; Cappagh, Co. Waterford; and Drumreaske. The Irish *B. repandata* may be divided roughly into two groups, namely those with some tone of brown ground colour, and those with grey. Ruddy warm browns are scarcely ever shown. Of the grey forms, one of the most remarkable is that with a whitish median band traversing a pale speckled wing, the strigæ, &c., being almost obsolete, the insect having a general resemblance to a small *Boarmia consortaria*, but less ochreous. This form occurs at Killarney, Kenmare, Sligo, Clonbrock, and sparingly elsewhere. It is also met with in Scandinavia. The almost unicolorous grey variety *destrigata*, Haw., with nearly obsolete markings, prevails as a local form in several Irish districts, as about Sligo and Castle Bellingham, and in the Co. Galway; and sparingly at Killarney and Kenmare. Specimens nearly approaching var. *sorodensium*, Weir (except in its blue tint and diminutive expanse), are met with. The handsome var. *conversaria*, Hb., is the most remarkable of the group with brown ground colour; and it is notable that while in the grey forms the median band tends to be paler, in the brown it becomes darker than the ground colour. This variety is not rare in certain localities, as at Newcastle, Co. Down (*Bw.*), and near

Kenmare; and is found also occasionally at Killarney; Cappagh (*Miss V.*) and Dromana, Co. Waterford; Greystones, Co. Wicklow, &c. The darkest unicolorous forms of this species are very rare in Ireland. I have one or two of bistre-brown or blackish tone, taken at Killarney and Castle Bellingham; but two sooty-black specimens, with a faint pale submarginal festooned line identical with the melanic Yorkshire variety, have been captured by Mr. Dillon at Clonbrock, Co. Galway; and somewhat resemble the black Swansea variety of *Tephrosia crepuscularia.* Curious aberrations may also be noted devoid of almost any markings, except a large dark blotch at the junction of the elbowed and submarginal lines, half-way between the anal angle and the costa of the fore wing, similar to that shown in *Tephrosia consonaria* I have not been able to trace any response to environment in the occurrence of any of the above forms or varieties in reference to their respective habitats. In Kerry the whitish and grey and melanic aberrations occur side by side. Probably, however, the whitish and grey forms would find themselves protected when resting on birch trees where they are numerous. I am inclined to think, from observations I have made, that these insects frequently choose a resting spot which conforms to the hue of their wings.

(To be continued.)

ON THE GENUS *GYMNOPLEURUS*, ILLIGER; WITH A LIST OF SPECIES AND DESCRIPTIONS OF TWO NEW GENERA.

By John W. Shipp.

The genus *Gymnopleurus* was founded by Illiger (Mag. ii. 1803, p. 199) for the receptacle of the section of the then Scarabæidæ (Ateuchini) having the dorsal margin of the first segment of the abdomen uncovered, and the elytra having the lateral margins strongly sinuate near the base.

The characters by which Macleay (Horæ Ent. p. 510 *et seq.*) sought to arrange the species in divisions were chiefly founded on the number of teeth on the clypeus, and other variable and slight characters.

This genus, of which sixty-two species were enumerated by Harold (Cat. Col. Scar. 1868), has since been augmented to 105; and I do not doubt that in a few years it will be still largely increased, now that the interior of the African continent is being opened up, and becoming more thickly populated.

The species of the genus are as follows:—

GYMNOPLEURUS, Illiger.

Mag. ii. 1803, p. 199; Muls., Col. Fr. Lamell. p. 53; Erichs., Nat. Ins. iii. p. 754; Reitter, Ver. Nat. Vereines Brunn, xxxi. p. 163.

[ETHIOPIAN REGION.]

1. *ænescens*, Wied., Germars, Mag. Ent. iv. p. 128, 1821.
   = *bufo*, Macleay, Horæ. Ent. p. 515.
   = *speciosus*, Dej., Cat. 3rd ed. p. 151.
   = *fulgidus*, Leach, MS.
   Cape of Good Hope.
2. *æneipes*, Fairm., Ann. Soc. Ent. Belg. xxxvii. 1893, p. 144.
   Oebbi, N. E. Africa.
2a. *æneus*, Har., Stett. Ent. Zeit. xxxvi. p. 453.
   Monrovia.
3. *æruginosus* (Koll. MS.), Harold, Col. Hefte ii. 1867, p. 94.
   Egypt; Kordofan.
4. *affinis*, Macleay, Hor. Ent. 1821, i. 2, p. 515.
   Senegal.
5. *anthracinus*, Klug, Sym. Phys. v. t. 41, f. 7.
   Arabia.
6. *atratus*, Klug, *l. c.*, f. 4.
   Arabia.
7. *atrovirens*, Kolbe, Stett. Ent. Zeit. 1895, p. 335.
   Victoria Nyanza, West.
8. *azureus*, Fabr., Syst. El. i. p. 57; Reiche, Voy. Gal. Abyss. 1850, p. 304; *Galinieri*, Reiche, MS.
   Abyssinia.
9. *bicolor*, Latr., Voy. Calliaud. iv. 1827, p. 281; Cast., Hist. Nat. ii. p. 71; Dej., Cat. 3rd ed. p. 151.
   = *cyanopterus*, Sturm., Cat. 1843, p. 319.
   Sennaar; Nubia; Mozambique; Egypt.
10. *bocandei*, Waterh., Ann. Mag. Nat. Hist. v. 1890, p. 368.
   Senegambia.
11. *cælatus*, Wied., *l. c.*, 1821, p. 127.
   = *bicolor*, Cast., Hist. Nat. ii. p. 72.
   = *lichensteinii*, Boh., Ins. Caffr. ii. p. 186; Cast., *l. c.*, p. 72; Illiger, Dej. Cat., *l. c.*, p. 151.
   = *macleayi*, Cast., *l. c.*, p. 72.
   = *leei*, Macleay, H. Ent. p. 514.
   Cape of Good Hope; Cape Colony.
12. *caffer*, Boh., *l. c.*, p. 181.
   Caffraria.
13. *chloris*, Klug, Monatsbr. Berl. Acad. 1855, p. 650; Peters, Reis. 1862, p. 215.
   Sena.
14. *cærulescens*, Oliv., Ent. i. 3, p. 189, t. 27, f. 231; Cast., *l. c.*, p. 71.

var. *centralis*, Bates, P. Z. S. 1890, p. 482.
Senegal R.

15. *consanguineus*, Kolbe, Stett. Ent. Zeit. 1895, p. 334.
Victoria Nyanza.

16. *coracinus*, Boh., *l. c.*, p. 185.
Natal.

17. *crenulatus*, Kolbe, Stett. Ent. Zeit. 1895, p. 333.
Albert Edward Nyanza.

18. *cupreus*, Boh., *l. c.*, p. 185.
Caffraria.

19. *cupreovirens*, Kolbe, Stett. Ent. Zeit. 1895, p. 333.
Victoria Nyanza.

20. *delagorgei*, Waterh., Ann. Mag. Nat. Hist. (6), 1896, v. p. 370; Kolbe, Stett. Ent. Zeit. 1895, p. 335.
Natal.

21. *diffinis*, Waterh., *l. c.*, p. 372.
Senegal R.

22. *elegans*, Klug, Symb. Phys. v. t. 41, f. 6.
= *anaglypticus*, Sturm., Cat. p. 103.
Arabia.

23. *fastiditus*, Har., C. H. 1867, i. p. 74; Dej., Cat. p. 150; Kolbe, Stett. Ent. Zeit. 1895, p. 334.
capicola, Hope, MS.
= *mundus*, Macleay, H. Ent. p. 510.
Cape of Good Hope; Natal.

24. *fulgidus*, Oliv., Ent. p. 167, t. 22, f. 199; Macleay, *l. c.*, p. 515; Har., Col. Hefte viii. p. 5.
= *leei*, var., Fab. Syst. El. i. p. 58.
Senegal R.; Keren.

25. *hilaris*, Hope, Ann. Mag. Nat. Hist. ix. 1842, p. 494.
Sierra Leone.

26. *hildebranti*, Har., Deutsch. Ent. Zeit. xxxvi. 1875, p. 218.
N. Abyssinia.

27. *humanus*, Macleay, H. Ent. p. 514.
Cape of Good Hope.

28. *humeralis*, Klug, Mon. Berl. Ac. 1855, p. 650; Peters, Reis. p. 216, t. 12, f. 11, 1862.
Tette.

29. *indigaceus*, Reiche, Voy. Gallin. Abyss. 1850, p. 306, t. 18, f. 9.
= *cyaneus*, Roth., Wiegm. Archiv. 1851, i. p. 123.
Abyssinia; Tigre.

30. *ignitus*, Klug, Mon. Berl. Ac. 1855, p. 650; Peters, Reis. 1862, p. 217.
= *cæruleovirens*, Sturm. MS.
= *cupricollis*, Koll. MS.
= *dimidiatus*, Walth. MS.
var. = *thoracicus*, Har., C. H. iv. 1868, p. 79; Dup., Deg. Cat. 3rd ed. p. 151.

var. *læviuscula*, Kolbe, Stett. Ent. Zeit. 1895, p. 336.
Tanga; Pangani; Mombassa; Zanzibar; Lower Nubia.

31. *infranitens*, Fairm., Ann. Soc. Ent. Fr. (6), vii. p. 108.
E. Africa.

32 *jacksoni*, Waterh., Ann. Mag. Nat. Hist. v. 1890, p. 370.
E. Africa; Masai Land.

33. *krugeri*, Kolbe, Stett. Ent. Zeit. 1895, p. 336.
Masai Land; N. Usambara.

34. *lætus*, Hope, Ann. Mag. Nat. Hist. ix. 1842, p. 494.
Cape Palmas.

35. *lævicollis*, Cast., *l. c.*, p. 71; Lansbr. Revoils. Faun. et Flor. Somali Ld. Col. p. 14; Har., Col. Hefte viii. p. 5.
= *kordofanus*, Koll. MS.
Sennaar; Somali Land; Keren; Lebka; Insaba.

36. *latreillei*, Cast., *l. c.*, p. 71.
= *viridis*, Dej., Cat. p. 151.
Nubia.

37. *leei*, Fabr., Ent. Syst. i. p. 65.
Cape of Good Hope.

38. *lugens*, Fairm., C. R. Ent. Belg. xxxv. p. cclxxxiv.
E. Africa.

39. *malleolus*, Kolbe, Stett. Ent. Zeit. 1895, p. 334.
Uganda; Lake Tanganjika.

40. *modestus*, Lansb., Notes Leyd. Mus. viii. p. 72; Shipp, Ent. 1895, p. 3.
Benguela

41. *mœrens*, Kolbe, Stett. Ent. Zeit. 1895, p. 335.
Witu, E. Africa.

42. *nitens*, Oliv., Ent. i. 3, p. 159, t. 7, f. 55; Cast., *l. c.*, p. 71.
= *corruscus*, Dup. Dej., Cat. p. 150.
Senegal R.

43. *olivaceus*, Quedenf., Berl. E. Zeit. xxviii. p. 269.
Malange.

44. *olivierii*, Cast., *l. c.*, p. 72.
= *micans*, Dej., Cat. p. 151.
Senegal R.

45. *peringueyi*, Shipp, Ent. 1895.
= *modestus*, Pering., T. S. Afr. Phil. Soc. iv. pt. 2, p. 94.
Beaufort West, Cape Colony.

46. *plicatus*, Fairm., Ann. Soc. Ent. Fr. (6) x. p. 547.
Obock.

47. *profanus*, Fabr., Ent. Syst. i. p. 64; Cast., *l. c*, p. 72.
Guinea.

48. *pustulatus*, Kolbe, Stett. Ent. Zeit. 1895, p. 335.
Lake Tanganjika.

49. *reichei*, Waterh., *l. c.*, p. 369.
Abyssinia.

50. *rutilans*, Cast., *l. c.*, p. 71.
    Sennaar.
51. *sericatus*, Erichs., Wiegm. Archiv. 1843, i. p. 232.
    = *ducalis*, Dohrn. MS.
    Angola.
52. *sericeifrons*, Fairm., Ann. Soc. Ent. Fr. (6) vii. p. 108.
    E. Africa.
53. *signaticollis*, Waterh., *l. c.*, p. 369.
    Nubia.
54. *smaragdinus*, Boh., Ins. Caffr. ii. p. 187.
    Caffraria.
55. *somaliensis*, Lansb., Revoils. Fa et Fl. Somali Land. Col. p. 15.
    Somali Land.
56. *splendens*, Cast., *l. c.*, p. 71; Har., Col. Hefte viii. p. 4.
    = *profanus*, Latr., Voy. Cailliaud. iv. p. 281.
    = *splendidus*, Bertol., Nouv. Comment. Ac. Bonon. x. p. 393; Dej., Cat. p. 150.
    = *virescens*, Walth. MS.
    var. *wahlbergi*, Boh., Ins. Caffr. ii. p. 183.
    var. oliviera, J., Sc. Lisb. ix. p. 40.
    = *amœnus*, Reiche, MS.
    Nubia; Sennaar; Fassoglu; Mozamb. Caffraria; Natal; Keren.
57. *subcupratus*, Boh., Ins. Caffr. ii. p. 184.
    Limpopo.
58. *thalassinus*, Klug, Monatsb. Berl. Ac. 1855, p. 650; Peters, Reis. 1862. p. 216.
    Tette.
59. *thelwalli*, Waterh., *l. c.* (6), v. p. 367.
    Lake Nyassa.
60. *tristis*, Cast., *l. c.*, p. 72.
    = *fuliginosus*, Dej. MS.
    = *modestus*, Walth. MS.
    = *plicatipennis*, Hope MS.
    Senegal; Nubia.
61. *unicolor*, Boh., Ins. Caffr. ii. p. 182.
    Gariep.
62. *umbrinus*, Gerst., Arch. f. Nat. xxxvii. p. 49; Van. d. Deckens' Reis. iii. pt. 2, pl. vii. f. 6.
    Zanzibar.
63. *vanderkelleni*, Lansb., Notes Leyd. Mus. viii. p. 72.
    West Africa.
64. *virens*, Erichs., Wiegm. Archiv. 1843, i. p. 231.
    = *gibbosus*, Roth., Wiegm. Archiv. 1851, i. p. 123.
    = *nitidus*, Dej., Cat. p. 151.
    = *pumilus*, Reiche, Voy. Gal. Ab. 1850, t. 18, f. 10, p. 308.
    Tigre; Congo; Abyssinia.

(To be continued.)

LEPIDOPTERA IN 1896.

NOTES FROM THE CHESTER DISTRICT.

(Continued from vol. xxix. p. 216).

LEPIDOPTERA. — In June, at Chester, *Timandra amataria*, *Phibalapteryx lignata* (both plentiful), *Cilix spinula*, *Hepialus humuli* vars. with primaries marked brown, *H. lupulinus* (one unicolorous without the white markings on primaries), *Melanippe montanata*, *Rumia luteolata* (*cratægata*), *M. sociata*, *Emmelesia decolorata*, *Cidaria dotata* (*pyraliata*), *Acidalia aversata*, *Hydrocampa nymphæata* with very dark forms, *Eurrhypara urticata*, *Hypena proboscidalis*, *Spilodes verticalis* (last four species about ponds and marshes), *Xanthosetia hamana* (by road-sides), *Xylophasia rurea* with var. *alopecurus*, *Phalera bucephala*, *Phlogophora meticulosa*, *Plusia chrysitis* with the banded form, *P. festucæ* (worn), *P. iota* (scarce) *P. pulchrina* var. *aureum* (one), *P. gamma* (very few this season), *Hadena oleracea*, *Apamea gemina* (variable as usual), *Hydræcia nictitans*, *A. oculea* (very variable). At Delamere Forest, on June 20th, *Cænonympha typhon* (*davus*) (four specimens only—too late for the butterfly this hot season), *Bombyx quercus*, *Drepana falcataria*, *X. polyodon*. *Anarta myrtilli* was not so abundant as last season; specimens "dark reddish black" (see Catalogue of Lepidoptera of Ireland, Entom. xxix. p. 233), but with the white central spot on primaries clear and well developed; I took one, however, with this spot entirely absent. *Camptogramma bilineata*, *Ematurga atomaria* (dark vars., and a nearly black male), *Aspilates strigillaria* with very dark forms (not so abundant this season).

In July, at Chester, *H. oleracea*, *P. festucæ* (one), *P. chrysitis* (one of two specimens a banded form), *H. humuli* (one), a *C. spinula* on the 21st (second brood), *C. dotata* (*pyraliata*), *Larentia didymata* (large and very dark), *L. viridaria* (*pectinitaria*), *Epione apiciaria* (two worn males), *Rivula sericealis*, *Zanclognatha grisealis* (last two very local, by pond margins). At Delamere Forest, on the 23rd, *Cænonympha pamphilus*, *Polyommatus phlæas*, *Lycæna icarus* (*alexis*) (all comparatively scarce). I was in London until August. From the tops of the West End omnibuses I frequently saw butterflies, dark and of the size of *Vanessa urticæ*; also a day-flying moth, probably *Orgyia antiqua*. A few very dusky forms of *C. pamphilus* seen on the bare, sunburnt fields between New Barnet and Hadley Wood.

On Aug. 6th, in North Wales, I never saw vegetation so poor, thin, and sun-dried; hardly a trace of the usual wealth of flowers, and very few insects. *L. didymata* with forms almost white to almost black, *Parage megæra* (one), *Pieris brassicæ* (common locally). On the 8th, at Delamere Forest, hardly any insects, *Hypsipetes elutata* (two), *Charæas graminis* (tawny and black-brown forms), *C. phlæas* (one). Near Chester, *V. io*, *P. rapæ*, *Noctua umbrosa*, *Coremia designata* (*propugnata*), *Cabera exanthemata*, *N. xanthographa* (reddish and black forms), *Paraponyx stratiotalis*, *E. apiciaria* (worn), second broods of *Liparis auriflua*, *C. spinula*, *P. lignata*. At gas-lamps moths were equally scarce—three specimens of *Eugonia erosaria* (*tiliaria*), one a female.

In September, at gas-lamps, *Neuronia popularis*, *Luperina testacea*, *L. cespitis* (all males), *Melanippe fluctuata*, *Cidaria russata* (two or three very small and poor examples of each).

In October, *Agriopis aprilina* (one, at rest on an oak just outside the city), *Oporabia dilutata*.

In November, at gas-lamps, *Hybernia defoliaria*, *Cheimatobia brumata*, *Pœcilocampa populi* (a few of each).

In December, *P. populi* (two, one at a gas-lamp, the other flew into a shop in the city).

Larvæ and Pupæ.—Mr. Hargreaves gave me, on April 4th, a caterpillar of *Noctua brunnea* he had taken in Delamere Forest. The moth, a fine dark one, appeared on June 9th. In North Wales, larvæ of *Agrotis ashworthii*, in usual quantity. Out of two dozen or more I only got six moths—one a cripple—in June. This was similar bad luck to last year's. All *ashworthii* breeders, I fear, must lay themselves out for this, and be glad if they sometimes meet nothing worse. Mr. Hargreaves brought me seven larvæ of *Bombyx quercus* from the Lancashire sandhills, where he found *Nyssia zonaria* imagines. Six male and female *quercus* emerged from their cocoons in July, the first a male with the right lower wing entirely absent. Curiously enough I came across, in Delamere Forest, on July 11th, a *Vanessa urticæ* exactly in the same condition. It was a fresh specimen, and was able to get along so well with three wings that I failed to net it. In April and May larvæ of *Arctia caia* and *Odonestis potatoria* were unusually abundant around Chester. Of the first species I took at least two hundred caterpillars, in the hope of getting something startling as a "variety." As usual, I was disappointed. Still, there were some interesting forms. Sometimes the chocolate blotches nearly covered the primaries; sometimes the black spots were equally in the ascendant on the secondaries; but the most interesting feature was the difference in tint of the secondaries, from deep yellow with the barest suspicion of red in one example, to deepest crimson in another. These two (males) I added to my collection; the first has only four spots on each lower wing; the other has the secondaries well blotched with large and often confluent spots. Another specimen has the left secondary much more spotted than the right. Lastly, the ground colour of the primaries in some of the moths is a pure white, in others very ochreous. Many larvæ were ichneumoned; some succumbed in the second stage to a parasite which left them as if preserved; others, in the final stage, to a different species, which crawled in swarms out of the caterpillars as white maggots, and then spun tiny whitish cocoons. Frequently, after being disturbed by a companion, a larva would leave off spinning, take to the floor of the cage, and there change into a chrysalis. This had to be quickly removed, or it would be devoured by the remaining larvæ. I selected about forty of the moths for setting; the rest I took a mile or two into the country, in different directions, as they emerged. Had I not done so, some of them would have been brought to me by people offering them for sale. On April 6th I took a larva of *Spilosoma fuliginosa*, spinning up on the heather on the top of Moel Fammau. The moth appeared on May 6th, a fine male, and almost as dark as the var. *borealis*. On April 16th, eggs of Beeston Castle *Polia chi*, crossed by Durham *olivacea*, hatched. Fed up on groundsel. The larvæ did badly, many dying. Survivors pupated by June 20th. First emergence, August 10th. Imagines all *olivacea*, except two which were typical. Larvæ of *Xanthia cerago* unusually plentiful; a few *X. silago* and *X. ferruginea*. These were captured as they crept from the sallow catkins on which I fed *A. ashworthii*. On May 19th I took five pupæ of *P. festucæ* from *Glyceria aquatica;* also one on the 20th, and two on the 25th. The imagines appeared from May

31st to June 11th; pupæ of second brood scarce; took two, Aug. 14th; only one moth emerged, Aug. 30th. May 23th, *Amphidasys betularia* var. *doubledayaria*, from last year's pupæ. On May 24th I lost all my young larvæ of *Amphidasys strataria* (*prodromaria*) and *Tephrosia biundularia*, through not being able to attend to them. On June 8th some Delamere *Cabera pusaria* began emerging; I did not get the "black" form among the specimens. I found larvæ of *Hybernia marginaria* (*progemmaria*) to be combative and cannibal; they diminished in numbers daily. Larvæ of *Nyssia zonaria*, hatched May 7th and all pupated by July 15th, I found very combative, but not cannibal. In June *Smerinthus ocellatus*, *S. populi*, and *A. lucernea* appeared from last year's pupæ; also *Notodonta dromedarius*. July, *Lophopteryx camelina* (light and dark forms). Larvæ of last two species from Delamere Forest. July 23rd, larvæ of *Eupithecia pulchellata* common in foxglove flowers, Delamere Forest. *Anarta myrtilli* plentiful; picked two dozen in half an hour or so off the tops of the heather; their chequered pattern of green and yellow made them easily seen. Caterpillars of a sawfly also, on the heather tops, in plenty; head reddish, face black, rest of caterpillar (above and underneath) putty colour; a row of thirteen large, very black spots (one on each segment) along each side just above the pale, indistinct brown spiracles; below spiracles an almost continuous line of similar spots; there is also a medio-dorsal indistinct row of elongated black marks. Legs putty colour, spotted with the same intense black. The larva I wrote this description from I watched change its skin, through a lens, on July 24th. I was particularly struck with the delicate sense of touch exhibited by the six legs, which terminate in what looks like a miniature hand with one finger. This finger is most sensitive, and is composed of contractile tissue. Thus it can be extended, or contracted, or bent in on the palm for grasping purposes, and ends in a claw. The two front legs seem especially sensitive, a highly nervous movement or twitching being always visible. This caterpillar spun a close brown cocoon next day, very like that of *Eriogaster lanestris*, but a little smaller. Ichneumons on the wing unusually common. On Aug. 22nd I took a larva of *S. ocellatus* near Chester, off sallow; there had evidently been a considerable number at the place. There were several broods also of *P. bucephala*. The *S. ocellatus* pupated on Aug. 29th. Several larvæ of *Acherontia atropos* were found in the district about this time. From Oct 3rd to 17th *Bombyx rubi* caterpillars were abundant on a certain Delamere heath; I picked up a hundred full-grown ones, reserved fifty for myself, and divided the rest between a couple of friends. The object was to try the chip-box system for hybernation, each caterpillar being put into a separate box when full-fed at the end of October, and the boxes kept on a warm mantelpiece. The experiment, in each case, was a total failure. Three of my larvæ died in spinning up, and the rest before any attempt at spinning, by the end of December; two were ichneumoned, the parasite larvæ behaving as in the second case of *A. caia*. Ichneumon black, head also, antennæ long and robust. Legs brown-black. Ovipositor hardly visible through a lens, and without sheath. Upper wing with three contiguous areolets; first black, and rests on centre of costa; second and third stretch obliquely in direction of wing-base as far as the wing-centre; a nervure then proceeds from the third to the base of the wing. Four wings transparent, except costal black spot or first areolet. Many of the parasites emerged from their cocoons in December; the rest seem to be lying over the winter. The chip-box experiment included a few caterpillars of *Nemeophila russula* and *S. fuliginosa* I took on the same heath. They all died. Three of the latter were almost black; the other four were of the usual foxy colour. I should be glad to have the names of the sawfly larvæ and of the ichneumons.

Dragonflies.—Out of a total of thirty-seven British species, we have sixteen in the Chester district. I saw ten of these sixteen during the season. I append a list:—

Ischnura elegans. Chester. Plentiful from May 19th to June 27th. There was a second brood, few in number, Aug. 14th.

Agrion puella. Chester. Flying with *I. elegans.* Plentiful; May 19th to June 20th.

Enallagma cyathigerum. Chester and Delamere; June 20th to July 23rd.

Platetrum quadrimaculata. Delamere. Scarce this season; June 20th to August.

Leucorrhinia dubia. Delamere. Less in numbers than last summer; June 20th to July 11th.

Sympetrum scoticum. Delamere. Not so numerous either; July 11th to Oct. 3rd.

Æschna grandis. Common about Chester as usual; July 6th to end of August. I saw one hawking along a hedge, July 14th, at 9 p.m.; another on the 21st, at the same time. Netted the last one, and then let it go.

Æ. juncea. Delamere. Common from July 11th to about the end of August. Rather late in appearance. Inadult, July 11th; spots lavender colour; wings very perfect and beautiful, as if glazed with transparent varnish. Altogether it had a pale lavender appearance on the wing, exactly like the dragonfly I could not make out at Witherslack (Entom. xxvii. 307). I have now no doubt the latter was an immature *Æ. juncea.* This species I have seen on the wing at 7 p.m.

Lestes sponsa. Delamere. Unusually numerous from July 11th to almost the end of August.

Cordulegaster annulatus. A male, taken about the middle of August, in the railway yard at Arthog, near Barmouth, was brought to me Sept. 3rd.

My collection now only numbers twenty-six species; the remaining eleven, chiefly Fen and Rannoch species, appear difficult to get—J. Arkle; Chester.

Lepidoptera in Suffolk.

The records of past years afford conclusive evidence that the county of Suffolk is eminently suited for the study of entomology, and this *résumé* of a year's work amongst the Lepidoptera, principally in the neighbourhood of Ipswich, though not perhaps including any insect of exceptional rarity, will, I think, prove the truth of the foregoing remark. Although my diary does not run to the extent of pages which it did in 1895, it must not be inferred that the season was less productive than its predecessor, for that result is partly attributable to the irregularity with which my entomological pursuits were conducted, owing to professional engagements, and partly to the miserable weather of the autumn. In collecting the Micros the time at my disposal was principally devoted to the consequent neglect of the Macros. Light I practically neglected, and I need only say that my anticipations in regard to it (Entom. xxix. 53) have been realized, the introduction of the incandescent gaslight having materially diminished the number of visitants to the central electric arc lamps, which have been comparatively deserted, the decrease being especially noticeable in the case of the Sphingidæ, the Notodontidæ, and the Bombycina generally.

The earlier months of the year were marked by extraordinary mildness —a great contrast to the Icelandic severity of the winter of 1894–5—and as a consequence the Hybernidæ and other harbingers of spring were out fully a month earlier, but by no means so plentiful; and this suggests the question whether a sharp winter is conducive to an abundance of Lepidoptera, or otherwise, to which I am induced to reply in the affirmative. Nothing of note was taken in January and February, but towards the end of March, Bentley Wood—the local collectors' "happy hunting-ground"—was frequented by *Diurnea fagella* and *Tortricodes hyemana*, amongst the former being many melanic forms, which I fancy increase yearly. Several *Brephos parthenias* were on the wing, and *Nyssia hispidaria* and *Cymatophora flavicornis* occurred, but my visits to the wood were made at a wrong time to reward my search. Hybernated specimens of *Dictyopteryx contaminana*, *Depressaria applana*, and *D. umbellana* were met with, the latter, which was newly added to the "Suffolk List of Lepidoptera" last year, being fairly common, and in good condition, on Rushmere Heath. Here I expected to find larvæ of *Bombyx rubi*, but only one was discovered, and that unfortunately had fallen a victim to the tread of the golfer, who bids fair to exterminate many of our heath-frequenting insects. The list for the month was concluded by two beautiful specimens of *Alucita polydactyla* and *Tæniocampa munda*, at electric light. The Tæniocampidæ, I might say, were left to their nightly refection at the sallows unmolested, but the genus was very poorly represented elsewhere, for I only saw a few *T. instabilis*, and not one *T. gothica*. *T. gracilis* visited light in April, with a good-conditioned *Gonoptera libatrix*.

May was an ideal month for the lepidopterist, and Micro-collecting was pursued with advantage, especially towards the close of the afternoons, when the hedgerows abounded with the ubiquitous *Symæthis fabriciana* and *Swammerdammia pyrella*, others not so common being *Dicrorampha* (*Endopisa*) *saturnana* (one with one fore wing darker than the other), *Harpella geoffrella*, *Tinea cloacella*, *Elachista rufocinerea*, *Lithocolletis scopariella*, *L. sylvella*, and doubtful specimens of *Ornix anglicella* and *Bucculatrix boyerella*. A fine newly-emerged *Smerinthus tiliæ* was taken at rest on a wall. The genus *Depressaria* was represented by solitary examples of *arenella* and *alstrœmeriana*, and it is noteworthy that whereas in 1893 these could be freely netted at dusk along the hedgerows, they have since been scarce. Visiting the wood on May 30th, I found the localised *Tephrosia punctulata* (which exhibited considerable variation) swarming on tree-trunks, which also yielded three specimens of *Lobophora hexapterata*, together with several *Cidaria corylata*, the skittish *Ephyra pendularia*, and *Scoparia ambigualis* (which swarmed). *Macaria notata* and *Drepana falcula* were on the wing, evidently just emerged, other Macros being *Fidonia piniaria* (common), *Strenia clathrata*, *Asthena candidata*. *Herminia barbalis*, *Acidalia remutata*, and *Panagra petraria*, a pest to the wood in 1895, were appreciably fewer in number. In addition to *Lobesia reliquana*, *Argyresthia conjugella*, and *Bucculatrix ulmella* (all new to Suffolk), I boxed the following Tortrices:—*Tortrix ministrana*, *Sericoris lacunana*, *S. urticana*, *Roxana arcuana* (all more or less common), and these Tineæ:—*Tinea rusticella*, *Micropteryx sparmannella*, *Adela viridella*, *Gracilaria swederella*, *Coleophora anatipennella*, *Tischeria complanella*, *Lithocolletis ulmifoliella*, and *L. quercifoliella* (common, but not previously recorded for the county). The tenacious larvæ of *Pœcilocampa populi* and *Agriopis aprilina* were found in the crevices of oak-trunks, and were afterwards successfully reared. In the town two *Amphidasys betularia* were taken in cop. from palings, and the var. *doubledayaria* came to light, with others, including *Sphinx ligustri, Smerinthus populi, S. ocellatus, Cerura vinula* (female), *Pygæra bucephala, Thera variata, Eupithecia centaureata, Crambus chrysonuchellus, C. pratellus*, and *Cemiostoma laburnella* (common).

The summer was characterized by great heat and unusual dryness, but notwithstanding the woods retained their luxuriant leafage until late in the year, a contrast to the summer of 1895, when the bushes were simply bereft of their foliage through the ravages of the larvæ of the Hybernidæ, *Cheimatobia brumata, Phigalia pilosaria*, and other autumn and spring insects, to the detriment of day-collecting. June 9th was a gloriously fine day, and I was induced to visit Bentley Wood. On the route I detected, on palings, *Sciaphila subjectana, Lobesia reliquana* (female), *Micropteryx seppella*, and *Nepticula subbimaculella*, and, arrived at my destination, I encountered *Euclidia mi, Venilia maculata, Macaria notata* (three), *Emmelesia affinitata*, and *Eupithecia plumbeolata;* whilst on trunks I boxed two *Nola confusalis* (*cristulalis*), *Acronycta rumicis*, and a long series of *Gelechia proximella*, with one or two of its prettier congener, *G. luculella*. Other Micros disturbed by the beating-stick were *Crambus geniculeus, Argyrotoxa conwayana, Ptycholoma lecheana, Spilonota rosæcolana, Halonota cirsiana, Capua ochraceana, Phoxopteryx lactana* (*Anchylopera ramella*), and *Swammerdamia cæsiella = spiniella* (new to Suffolk). In the fir-wood *Coccyx tædella* (*hyrciniana*) was netted, and *Coleophora laricella* was shaken from its food-plant. On June 14th, in the same collecting-ground, I added *Ephyra punctaria, Phibalapteryx vitalbata*, another *Argyresthia conjugella* (mountain-ash is spread well over the wood), and *Adela degeerella*. A favourite haunt in the suburbs of the town, in which clematis grows freely, was visited on June 2nd, and by dusking I secured *Ephipphiphora brunnichiana* (new to Suffolk), and a curious dark example of *Tinea rusticella*, with unusually broad fore wings, other captures being *Asthena luteata, Ligdia adustata, Melanippe procellata* (abundant), *Cidaria russata, Pyralis costalis, Penthina pruniana, Sciaphila virgaureana, Plutella cruciferarum, Elachista cygnipennella, Lithocolletis messaniella;* and, on palings, *Nepticula ? aurella*. At Bramford, on the 12th, over a small plot of yarrow, I caught *Conchylis straminea*, several *Dicrorampha petiverella*, and one *D. plumbana;* and when at Campsey Ashe, on the 23rd, two *Catoptria juliana, Sciaphila hybridana*, and *Argyresthia nitidella* were taken from elm-trunks. Captures at light in town during the month included *Orgyia pudibunda, Leucania comma, Phibalapteryx vitalbata, Pyralis farinalis, P. glaucinalis, Aglossa pinguinalis, Eudorea cembræ* (three), *Tortrix podana, T. heparana, T. unifasciana, T. viridana*, and *Depressaria heracliana;* whilst by other means I obtained *Mamestra anceps, Coremia quadrifasciaria, Cidaria fulvata, Cataclysta lemnata, Spilonota ocellana, Sciaphila nubilana, S. pascuana, Gelechia affinis*, and *G. vulgella*. A feature of the month and of the year was the extraordinary prevalence of clothes-moths, which were extremely destructive. My house was infested with *Tinea biselliella* (I had never seen it before), and I must have exterminated no fewer than 500 on their first emergence—the first few days of the month. Their breeding place I discovered in a disused mattress, and I found they could easily be reared. *Endrosis fenestrella*, of course, were numerous, and in evidence every morning in the milk-jug, and *Ephestia elutella* abounded; *Œcophora pseudo-spretella* and *Œ. fuscescens* occurred with less frequency. I may conclude these notes on the month by mentioning those Micros obtained by careful scrutiny of wall-ledges (a means of collecting which I recommend the adoption of):—*Batodes angustiorana* (two), *Depressaria costosa*, *Gelechia fugitivella* (these swarmed on elm-trunks), *Argyresthia gœdartella*, and *A. brochella* (several).

During July, among the visitants to light was an aberrant *Tortrix*. Mr. C. G. Barrett has seen the specimen, and considers it to be undoubtedly a variety, and, as its fore wings do not agree with *T. heparana*, has named it as probably *T. ribeana*. Other captures were *Odonestis potatoria*, *Plusia iota*, *Eupithecia coronata*, *E. sobrinata*, *Scoparia pallida*, *Crambus inquinatellus*, *Dictyopteryx lœflingiana*, &c. A fine variety of *Abraxas grossulariata*, with the fore wings from the centre to the costal tip completely black, was brought me by a friend; *Tinea ferruginella* was taken in a railway carriage whilst on the way to Felixstowe, and *Grapholita penkleriana*, *Steganoptycha nævana*, *Pædisca corticana*, *Tinea fuscipunctella*, *Hyponomeuta padellus*, *Prays curtisellus*, and var. *rustica* were found under wall-ledges. By beating at Blakenham, on the 8th, I collected *Acidalia emarginata*, *Eubolia mensuraria*, *Paraponyx stratiotalis*, *Hydrocampa stagnata*, *Ebulea crocealis*, *E. sambucalis*, and *Peronea variegana*; and by the same process at Akenham, on the 18th, *Iodis vernaria*, *Melanippe subtristata*, *Hydrocampa nymphæata*, *Crœsia forskaleana* (dark-blotched variety); and the following in or around the town:—*Cilix spinula*, *Eupithecia succenturiata*, *Tortrix rosana*, *T. xylosteana*, *Crœsia holmiana*, *Spilonota ocellana*, *Sphaleroptera ictericana*, *Carpocapsa pomonella*, and *Phibalocera quercana*.

An almost unprecedently dry summer had its reverse in a long spell of wet, cold weather, commencing from the latter end of August, and to this must be attributed the great falling off in insects. Those for August were mostly attracted to light, viz. *Hepialus hectus*, *Notodonta camelina*, *Catocala nupta*, *Noctua plecta*, *Cosmia affinis*, *Crocallis elinguaria*, *Ephyra omicronaria*, *Acidalia promutata*, *Aspilates gilvaria*, *Eupithecia subfulvata*, *E. assimilata*, *Pelurga comitata*, and *Hyponomeuta cagnagellus*. The "Thorns" were conspicuous by their absence—I did not secure any *Ennomos fuscantaria*, which was taken in considerable numbers in 1895; whilst *E. tiliaria*, usually a frequent visitor to the street-lamps, was only seen once. One *Xanthia citrago*, just emerged, was taken from palings on the 29th. From August my diary became almost a blank, and I have only to mention *Xylina rhizolitha*, *Hybernia aurantiaria*, and *Gelechia domestica* to conclude the year's record. I am indebted to the Rev. E. N. Bloomfield, and, through him, Mr. C. G. Barrett, for kind assistance in identifying the Micros.—Claude A. Pyett; Waterloo Road, Ipswich, December, 1896.

Notes from the Eastern Counties.

Last season was a phenomenally early one; the sallows were out a fortnight before their usual time, and moths were plentiful. In the first week in April I went to Hunstanton, but caught nothing specially noteworthy; the larvæ of *Antithesia variegana*, *Gelechia vulgella*, &c., were feeding on hawthorn, but were smaller than they were at Cambridge the preceding week. Subsequently I went down into the fens, and found the usual species out in plenty, and quite a fortnight earlier than their normal date.

In the last week in May I went to Epping Forest, where I obtained *Anticlea sinuata*, *Eupithecia virgaureata*, *Angerona prunaria*, *Melanthia ocellata*, *Acronycta aceris*, *Pyralis glaucinalis*, *Roxana arcuana*, &c., besides a good number of larvæ, the list of which is too long to give.

At Tuddenham, Suffolk, in July, I took *Ellopia fasciaria*, *Acidalia scutularia*, *A. osseata*, *A. ornata*, *A. aversata* var. *spoliata*, *A. emarginata*, *Emmelesia unifasciaria*, *Corycia punctata*, *Macaria liturata*, *Fidonia atomaria*, *Larentia miaria*, *Eupithecia linariata*, *E. lariciata*, *E. oblongata*, *E. succenturiata*, *Melanthia rubiginata* (banded form), *Melanippe rivata*, *M. unangulata*, *M. subtristata*, *Hypenodes costæstrigalis*, *Ennychia nigrata*, *Paraponyx stratiotalis*, *Pionea stramentalis*, *Crambus perlellus*, *C. falsellus*, *C. latistrius*, *Pœcilochroma ratzeburghiana*, *Retinia buoliana*, *Sericoris lacunana*, *Phibalocera quercana*, *Xanthosetia zœgana*, *Ochsenheimeria bisontella*, *Gelechia tæniolella*, *G. mulinella*, *G. dodecella*, *Aciptilia galactodactyla*, *A. tetradactyla*, and *Amblytilia acanthodactyla*, with other commoner species and several larvæ.—Albert H. Waters; Devonshire Road, Cambridge.

(To be continued.)

NOTES AND OBSERVATIONS.

The Christoph Collection.—I believe that this collection was sold intact, and that it is now in this country. Can anyone kindly inform me as to its present whereabouts?—R. South; 100, Ritherdon Road, Upper Tooting.

Platyptilia tesseradactyla, *L.*, in Ireland.—Mr. C. G. Barrett (Ent. Mo. Mag. xxxiii. 25) introduces this addition to the list of British plume-moths. Several specimens, sent to Mr. Barrett for identification, were taken by Mr. F. de Vismes Kane and the Hon. R. E. Dillon "in the first week in June, 1895, at Clonbrock, flying in the sunshine to the flowers of a species of *Gnaphalium* on a dry bank alongside a bog." Mr. Kane adds that a series was taken in 1894 by Mr. Dillon, but were supposed to be *zetterstedtii*; a single specimen has also been taken in another locality in Galway. The larva appears to feed on *Gnaphalium* in the flower-stem at first; and afterwards, in the spring, on the "larger young shoots." It will be remembered that the Noctua, *Calophasia platyptera*, discovered in this country last year, was also associated with *Gnaphalium*.

Apple-trees and Cheimatobia brumata.—For many years past part of my duties as head-gardener has been the care of fruit-trees. For a still longer period I have indulged in collecting moths, and *Cheimatobia brumata* flies at a season when I have most leisure for the work. I have collected in two or three different counties, and my observations have led me to infer that, at least in those localities, the male of the species in question does *not* carry up the female. After making frequent observations I have noticed that if the pairs are knocked lightly off the trees they fall to the ground; and when thrown into the air they do the same. If they are carried home in an open box they will not, while united, attempt to move or fly; but as soon as they part they begin to make off. The male flies to the female as she ascends the tree, and joins with her usually at about three or four feet from the ground; the female does not turn when joined by the male, but remains still in an ascending position; and as long as they remain united the male has its head in the direction of the base of the tree. The disengaged males, which usually number ten to one of the others, rest on the trees in a normal position. This moth is abundant in Middlesex, exceedingly so here; and we regularly grease-band our apple-trees, the large numbers caught show with what results. In the 'Entomologist' for February, 1895, p. 59, Mr. Rowland Brown mentioned that in the previous December the water of the dyke was strewn with the dead bodies of the males, and this is a thing of annual occurrence.—GEO. WALL; Grim's Dyke, Harrow-Weald.

TAPINOSTOLA BONDII.—Last week a landslip of the greensand, opposite "The Vicarage" here, shifted one end of the ground upon which *T. bondii* occurs; but fortunately the more inaccessible portions of the locality, which furnish the insect with its head-quarters, being well shored up by a strong stone wall, are in no present danger. It is curious to observe how excessively local and at the same time abundant the species is, or was, in its metropolis. For near on forty years men and boys have taken it by hundreds upon hundreds, and yet have not succeeded in eradicating it. The chief reasons for this concentration of the insect would seem to be that the best ground is difficult to work, and therefore never disturbed excepting in the *bondii* season; and that the food-plant (*Arrhenatherum avenaceum*) in the dry sandy soil grows rampant, and the tubers at the base of the stalks spread about, and thus afford an exuberance of nourishment (see Deakin, 'Florigraphia Britanica,' vol. i. p. 104); whereas there does not appear to be that tendency to such vigorous growth in clayey or chalky land. *Bondii*, so far as I am aware, has never been found on the chalk; but I have been told that a straggling specimen was once taken in "the warren" upon the gault.—H. G. KNAGGS; Folkestone, Feb. 9th, 1897.

FORCING ACHERONTIA ATROPOS.—In a late number I wrote that I proposed to try again the "moist forcing" of some pupæ of *A. atropos.* I beg now to state the results. Two larvæ and eight pupæ were sent to me from Sept. 4th to 10th. I placed the eight pupæ on moss, in a pot kept damp, by the fireside. Of these two were found to be dead; very probably injured when found by the potato-diggers. One moth emerged Nov. 4th; Dec. 2nd, one; 7th, one. Both these last were "crippled," one slightly; the other did not appear to have power to dilate its wings. Jan. 1st, another emerged; and another on the 10th. Both these were very fine and perfect insects, and one still remains under treatment. The two larvæ which went down in pots are still in a cool greenhouse. I may see the perfect insect in May or June.—H. W. LIVETT; Wells, Somerset, Feb. 9th, 1897.

ACHERONTIA ATROPOS.—I have been fortunate enough to rear four imagines from an equal number of larvæ. The pupæ were damped and forced according to the advice which has been given in the magazines. The larvæ came into my hands in August and early September. Mr. Leech was kind enough to send me the two larvæ which he recorded (Entom. xxix. 366). All the larvæ pupated as soon as I got them, and they were left alone until the beginning of October. They were then put into a greenhouse, the temperature of which was at a guess 60 or 70 degrees by day, and 50 or 60 degrees by night. Here they were watered, but without any regularity. The moths all emerged in November. Two of the pupæ were left in the earth, but I made it easy for the moths to escape by scraping away the soil until I broke open the top of the cocoon. The other two pupæ were placed among moss. Some trouble was taken to provide ladders, so that the freshly emerged moths would be able to climb up them and obtain a firm hold whilst the process of inflation of the wings was going on. One of the larvæ, when I received it in a box by post, should then have been underground. It had shrunk a good deal, and was quite unable to crawl. Instead of burying it in earth I just put it on a sheet of paper in the dark and it pupated all right. What interested me most about these insects was the seemingly unnecessarily large cocoon or cavity which they scooped out. This has been already referred to in your pages. The cavity looked quite capable of holding three pupæ easily instead of one. The interior is not smooth, but pitted all over with little indentations, which are, I suppose, the prints made by the feet of the larva, when it is enlarging the cavity by beating back the walls.—W. M. Christy; Watergate, Emsworth, Hants.

British Orthoptera.—Mr. M. Burr (*ante*, p. 28) mentions *Meconema varium*, Fab., being taken at sugar. Twice last season I took the same species by the same means: on Aug. 14th in the New Forest; and on Oct. 10th in Richmond Park. *Platycleis brachyptera* I have been accustomed to take in fair numbers in two localities near Esher, Surrey. Last season, however, it was apparently absent from one; the other I did not examine. One locality is by the side of a boggy pond; the other is on an open sandy spot. In both cases, however, the insect is taken on *Erica tetralix*, which grows luxuriantly in each place.—W. J. Lucas; 21, Knight's Park, Kingston-on-Thames, Feb. 10th, 1897.

High Flat-setting.—Mr. Warburg, in his plea for the adoption of flat setting on the ground that it would save him (and others) much trouble (*ante*, p. 45), appears to have lost sight of the immense amount of labour it would impose upon those who, as collectors of British Lepidoptera only, adopt the curved style. And not only this, what a number of our, in many cases, *best* specimens would suffer or be completely spoiled in the process, the "blues" for instance. On this ground alone we might well hesitate, however much we felt inclined to meet the wishes of foreign collectors; but, as I said before, we cannot all go in for foreign insects as well as our own, and we who have to rest content with the latter think it desirable to adhere to our present method of setting. Were we to admit continental types and series into our cabinets, which proceeding might or might *not* (probably the latter) prevent extermination of some of our species, it would be but the insertion of the thin end of the wedge that would surely eventually bring everything down to the continental level, a result greatly to be deplored. It would also, to my mind, greatly facilitate the palming off upon us by unscrupulous persons of continental or foreign specimens (common enough *there*) as British-taken rarities, a thing even now sometimes difficult to guard against. I would suggest that entomologists who set in the curved style, and who yet are in the habit of exchanging with or supplying foreign collectors, should mount some of their spare insects flat for this purpose, and so save their correspondents the trouble of resetting them. With regard to Mr. Jacoby's remark (Entom. xxix. 359), referred to by Mr. Warburg, "the setting *alone* is no guarantee," I should have thought that this was a fact so obvious to everyone that it did not require mention; but I venture to say that a British rarity if *flat set* would of a surety be eyed askance even although it might have the necessary "label." Also this gentleman's reference to "mites" did not seem to me to be quite happy. Is he not aware that in most, if not all, good English collections the specimens are set well up on the pins, and the wings do *not* touch the paper, consequently the "beautiful chance" spoken of does not come in at all; besides in a carefully kept cabinet mites ought to be almost if not quite an unknown quantity.—E. Sabine; Erith, Feb. 2nd, 1897.

High-Flat Setting, &c.—The remarks of a correspondent respecting this subject (Entom. xxix. 330, 1896) amuse me considerably, as they apparently seem to exhibit the preponderating influence of the commercial instinct. If we all collected insects with the paramount idea that they were ultimately destined for Stevens's Auction Rooms, the study would be completely revolutionised. I consider your correspondent a typical specimen of the British entomologist, in the prejudiced opinion which he possesses respecting the mode of setting insects. Another matter I should like to mention is the erroneous way the majority of entomologists have, in this country, of pronouncing the scientific names of insects. This is the outcome again of our insular isolation. Foreign entomologists have a great difficulty at first in understanding the English on account of their way of pronouncing Latin names, which on the Continent are pronounced very differently. Our style is not the orthodox one, and should most certainly give way to that in use on the Continent, both in countries where the Latin and the Teutonic elements prevail. Although I am pleased to see more persons in this country are taking an interest in foreign insects every year in proportion to what formally prevailed, it is "nothing but insular prejudice" perhaps which prevents many extending their interest, at least, to the European, of which the British Fauna, as the late H. W. Bates once said, constitutes only "a half-starved fragment." There is thus such little intercourse between British entomologists and their *confrères* abroad, that the opinion prevails generally in France and Germany that there are very few students of the science, in comparison, in this country.—W. Harcourt-Bath; Birmingham.

Uniformity in Pinning and Setting Lepidoptera.—Now that this subject has been brought forward, I hope it will not be allowed to drop until a satisfactory settlement has been arrived at if possible. Mr. Tunstall's suggestion (Entom. xxix. 299) to adopt standard sizes of pins is an excellent one, but I think it would not remedy the evil, for I consider that the setting-boards are quite as much in fault, if not more so. From my own experience I find that the setting-boards supplied by dealers are most unsatisfactory. The grooves are very often not deep or wide enough to set the insects well; a board that is wide enough for the wings is often too narrow in the groove to set the insect well up to the shoulder. I find it much better and cheaper to make my own boards. If we are to have standard pins, then let us also have standard setting-boards, the grooves of which shall be of a recognised width and depth. These boards should be numbered to correspond with the numbers of the pins. Thus, an insect that requires board No. 1 would have to be pinned with pin No. 1. A far better plan, however, would be to have pins all the same length, but of various degrees of thickness, to which the numbers would then refer. All sizes of boards should have the same depth of groove, and therefore all the insects would be the same height on the pin. The only objection to this plan would be that the smaller insects would appear to be set on the continental system, but by adopting a medium height for the larger ones, this would not perhaps be a serious drawback.—Edward Ransom; Sudbury, Suffolk, Jan. 1897.

Variation in the Colour of Acanthosoma hæmorrhoidale.—I have in my collection four specimens of this insect. One of them, captured on June 14th, 1892, was especially bright green in those parts which are usually green; the second, taken on Sept. 3rd, 1893, was green, but a much duller green; the third, taken on Oct. 28th, 1894, had the green parts a yellowy ochreous colour; the fourth, taken on Nov. 18th, 1894, had the same parts of a deep autumnal red colour. Hemipterists who have had more experience with this insect than I have will know whether this change of colour is typical for the different times of year. If it is so, it seems to me to be worth calling attention to, as the change in colour of the insect coincides with the change in colour of the leaves at the different times of year, which would be a great protection to it. —R. M. Leake; 15, Alleyn Park, S.E.

"Should the Formation and Arrangement of a Collection of Insects be made Subservient to the Elucidation of Scientific Problems?"—Commenting on this and other papers by Mr. W. Harcourt-Bath (Entom. xxix.), our contemporary, 'Natural Science,' in its February issue, says:—"The general question raised by Mr. Harcourt-Bath is of such wide and practical interest that we hope room may be found for further discussion of it. It is clear that specimens of any kind arranged in some logical order are more likely to elucidate problems than those arranged on no scientific plan; moreover, the superiority of specimens to elaborate descriptions, even to tabulated statements, is apparent at a glance. Evidence of the value of Mr. Bath's method is afforded by his paper 'On the Vertical Distribution and Derivation of the Rhopalocera in the Pyrenees.' Of course each individual collector will have his own predilections, problems, and arrangement; the more diverse their points of view the better."

Leucania unipunctata Migrating.—We learn from 'Psyche,' the organ of the Cambridge (Mass.) Entomological Club, that there were swarms of this moth last summer on the coast of New Hampshire; walls and ceilings of sleeping-rooms in some houses were so covered "that the rooms could not be occupied until the moths had been cleared out. In at least one case the rooms had to be fumigated with sulphur, and the dead moths swept up and carried away." Fishermen reported "a great cloud of the moths over their boat out on the sea."

Aberrations of Lepidoptera captured in 1896.—The first part of the summer 1896, from the middle of May up to July 25th, was quite exceptional with us, on account of the great heat and the large number of Lepidoptera it brought with it. Among the Lepidoptera captured the following three aberrations are most interesting.

The first variety is that of *Catocala nupta*. The second half of July was very remarkable for the extraordinary numbers of specimens of the genus *Catocala*. For many consecutive evenings the sugar-patches were literally covered with them: *C. fraxini* and *C. nupta*, as usual, were predominant; *C. adultera* and *C. pacta* were in fair numbers; *C. sponsa*, rarer, but also plentiful; and only *C. promissa* and *C. paranympha* were very rare. After the first evenings, in fact, these great moths became a nuisance, as they most unceremoniously pushed the other moths off the trees. Owing to their numbers a great many living specimens of *Catocala* could be inspected and compared with each other. On the whole, no marked difference existed between the examples of each species, only the primaries having a more or less distinct pattern, being more or less brilliantly coloured; the secondaries are always the same in form, except in the case of *C. nupta*, which has sometimes a broader or narrower black band. One of the specimens, however, showed exceptional aberration. Upper surface: fore wings show the usual margin, but all the other spots and lines, characteristic of *C. nupta*, are wanting; the wings are of a uniform greyish-brown tinge; the central dark spot is seen, and beneath it there is a large white one, corresponding in position with the white spot on the primaries of *C. fraxini*. The secondaries are of a peculiar red, considerably paler than usual, and having some pink colour in its composition; the black median band is wanting, and its position is only indicated by a series of grey marks and three short lines. The black border is rather narrower than in typical specimens. Taken at sugar, July 25th.

The second variety is a male *Argynnis selene*. This example was captured on the 26th of July, evidently an individual of the second brood; the first brood was on the wing this year from May 19th to the middle of June. The upper surface of the wings of this aberration is peculiar, as with the exception of a submarginal series of minute dots and the fine marginal lunules the black markings are confined to the basal half of each wing; the number of the marks themselves is eight on the fore wing and two on the hind wing. Of the eight spots on the fore wing not one occupies its normal place; all are either longer or larger than in typical specimens. The hind wings have only two marks: one is the usual round basal spot, characteristic of *A. selene;* the other, just beyond it, is in shape like the Greek letter Σ. The under surface of the wings is much paler than in the type; the black spots of the submarginal area are hardly seen, and the central band of the hind wing, consisting usually of alternately yellow and white spots, is wholly white with a silvery sheen. These differences, I believe, are due to the length of time that each specimen has lived; the less distinct marks and more uniform colour denote the older moths. The disastrous influence of daylight on the colours of moths is well known. I have seen a collection of Lepidoptera in a case with a glass lid, which stood in a well-lighted room for some ten years: the diurnal Lepidoptera were but little changed, but the nocturnal ones showed a complete absence of colour; the marks, which could still be distinguished, were in different shades of grey; even the blue of *C. fraxini* and the red of *C. nupta* had turned to a whitish grey.

The third specimen to be referred to is a female *Polyommatus hippothoë*, ab. This is a cripple; on each side alternately one of the wings is fully developed, and the other deformed. The upper surface shows on the two fully-developed wings no marked differences from normal *Polyommatus*, except that it is rather less red. The undersized wings are of a uniformly dark brown colour, without any marks at all. The under surface is of a greyish colour, the orange being only in the middle of the fully-developed wings. Of these last the fore wing has almost the normal number of spots; those on the submarginal series are elongated, the first two especially so; hind wing with fewer spots, first two of submarginal series elongated, and there is much red on the marginal area. The two small wings: fore wing has only one spot in the centre, all the others are obliterated, and only faint indications remain of the submarginal series; hind wing has only two distinct spots on the submarginal area; these are very elongated, and there are some further spots on the marginal and submarginal areas to be faintly traced; the basal spots are distinct.

In conclusion I wish to add that this summer the varieties were unusually plentiful: thus for instance *Helotropha fibrosa* and *Angerona corylaria* were much oftener met with than the types *H. leucostigma* and *A. prunaria*. All the above-described aberrations were captured near Lauga, Govt. of St. Petersburg.—B. N. Menshootkin; Chemical Laboratory, St. Petersburg University.

CAPTURES AND FIELD REPORTS.

Leucania extranea, *Gn.*, **in the County of Cork.**—A small example, only 1½ in. in expanse, was taken near Timoleague, on the coast of Cork, at sugar on a railway post, in September last, by Mr. R. J. F. Donovan. He sent it to me for identification, correctly named from Newman, but wished to make sure of its identity, as he is only a beginner. The specimen is in tolerable condition, and there can be no question as to the species. This is the second Irish capture; the other is in the cabinet of the Hon. R. E. Dillon, and was taken in the same month at Clonbrock, Co. Galway, which is some thirty miles inland from the sea, whereas Timoleague is on the Cork coast. It would therefore appear that the insect is indigenous here, though possibly originally introduced from America by ships. The species has not been taken on the European continent, and in Staudinger's Catalogue "Mad; Angl. m. (advena?)" is given, which suggests a doubt as to the identity of Mr. Bond's specimen from Freshwater in September, 1859, an untenable supposition. Mr. R. Donovan's brother, Dr. C. Donovan, collected Lepidoptera assiduously near Glandore, Co. Cork, before he went abroad, and rendered me much valuable help in studying the distribution of Lepidoptera in that district of the county. It is to be hoped that his work may be worthily supplemented by his younger brother, who has added such an important item to our knowledge of the range of this rare species.—W. F. de V. Kane.

Lycæna bellargus and L. corydon in 1896.—The year 1896 was a great year for *Lycæna bellargus* and *L. corydon* in the two localities in N. Wilts which I visited for them, on the look-out for varieties. A sloping bank of waste field at Winsley, about an acre in extent, where *Hipocrepis comosa* grows in plenty, was thickly studded with *L. bellargus* fanning its wings in the sunshine, or towards evening resting with closed wings on the grass-stems. The May brood was the most abundant; but out of the two broods in May and July I only took one good variety, which was an under side of the female with no spots except the central discoidal spot on each wing, and the hind marginal row of spots. Then early in August I paid two or three visits to the range of chalk downs extending east from Devizes, where I found *L. corydon* literally swarming; you could hardly walk without treading on a specimen, and along the base of the downs every flower of thistle and centaury had its two or three occupants. But, beyond the difference in the width of the black hind-marginal band, I did not notice any marked variation in the male, with the exception of one with the hind-marginal band white with black veins running through to the fringe. I also caught one dwarfed specimen with broad and rounded wings, looking quite a different species. I noticed that several males had a distinct black discoidal spot on the fore wings. Of the females I saw none of the form much mottled with white, such as I have found in Hampshire; but I caught nine of the blue variety (var. *syngrapha*), and saw as many more worn specimens. I was pleased to take this brilliant variety again. I first caught it in 1870, and then again in 1872, at which time I was living in the neighbourhood. After I left I paid several visits in later years, but I never saw another specimen till last year. Of the under side of *L. corydon* the only variation, beyond the enlargement of the spots, was the occasional absence of the basal spots of the fore wings, corresponding to var. *icarinus* of *L. icarus*. I have further to note that at Winsley, which is on the freestone, I saw one male *L. corydon* last year along with the *L. bellargus*, which is the only specimen I have seen there, except one other male which I saw in 1893 in the same district, but not at the same spot. I should be glad if any entomologist in the Bath district would say whether there is any *L. corydon* locality near there. Also I saw three male *L. bellargus* amongst the *L. corydon* near Devizes. I have never seen a specimen there before, though I lived there many years; but there must be a *L. bellargus* colony somewhere near, from which these specimens were stragglers. What most astonished me in these trips was that amongst such a prodigious number of specimens—and of *L. corydon* I must have seen thousands and examined hundreds—there should be so little variation from the type.—C. A. Sladen; Burton Vicarage, Neston, Chester, Feb. 2nd, 1897.

Setina irrorella in Sutherland.—Last June I found a specimen of this insect floating in a pool of water on a small island in Badcall Bay, on the west coast of Scotland.—Herbert Ashby; Pinehurst, Bassett, Southampton, Feb. 9th, 1897.

Notes from North Wales.—On May 28th and June 3rd, 1896, I took here at light three specimens (males) of *Agrotis cinerea*. Is not this generally considered to be a maritime insect? We are nearly forty miles from the coast here. I may add that *Vanessa c-album* occurs very sparingly in this part of Montgomeryshire.—Alfred S. Tetley; Llwynon-Newtown, N. Wales, Feb. 9th, 1897.

Lepidoptera of the Scilly Isles.—I am going down to the Scilly Isles at Easter, and should be glad of any information regarding the Lepidoptera of the islands. I am only a beginner, so any information through the 'Entomologist' would be thankfully received.—W. Hunt; 2, 4 & 6, Albert Bridge, Manchester, Feb. 13th, 1897.

Coleoptera in January.—The weather during the early part of January having been exceptionally mild, my brother and I have been busily engaged in collecting Coleoptera, principally by cutting grass tufts and examining bark of trees. We have during the first fortnight taken abont 150 species, among the more interesting of which are:—*Dyschirius globosus* (common), *Harpalus latus, Metabletus obscuroguttatus, Falagria sulcata* (common), *Conurus pubescens, Quedius maurorufus, Lathrobium longulum, Stilicus orbiculatus, Stenus pubescens, S. picipennis, S. latifrons, Phlœobium clypeatum, Pselaphus heisei* (one), *Tychus niger, Bryaxis fossulata, B. juncorum* (not uncommon), *Scydmænus collaris, S. scutellaris, Choleva morio, C. tristis, C. sericea, Parnus auriculatus, Lema cyanella Chrysomela varians, Cassida obsoleta, Apion difforme, Hypera polygoni, Liosoma ovatulum, Bagous alismatis, Tychias picirostris, Rhinoncus castor, Balaninus brassicæ, Ocalea badia, Hygronoma dimidiata, Othius melanocephalus, Corticaria fuscula, Psylliodes picina, Ocypus cupreus, O. fuscatus, Achenium depressum, Anthonomus ulmi, Ceuthorrhynchus litura, Ceuthorrynchidius floralis, Homalium iopterum, Leptusa ruficollis. Cassida oblonga, Rhizophagus bipustulatus.*—Bernard S. Harwood; Brooklyn Villas, Colchester.

SOCIETIES.

Entomological Society of London.—*January 20th*, 1897. *The Sixty-fourth Annual Meeting.* — Professor Raphael Meldola, F.R.S., President, in the chair. An abstract of the Treasurer's accounts, showing a balance in the Society's favour, having been read by one of the Auditors, the Secretary, Mr. H. Goss, read the Report of the Council. It was then announced that the following gentlemen had been elected as Officers and Council for 1897: President, Mr. Roland Trimen, F.R.S.; Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Walter F. H. Blandford and Mr. Frederic Merrifield; Librarian, Mr. George C. Champion; and as other Members of the Council, the Rev. Canon Fowler, Mr. Herbert Goss, Sir George F. Hampson, Bart., Herr Martin Jacoby, Prof. Raphael Meldola, F.R.S., Mr. Osbert Salvin, F.R.S., Mr. James W. Tutt, and Mr. G. H. Verrall. The President then delivered an Address, and took for the subject, "The Utility of Specific Characters from the Point of View of the Darwinian Theory." His remarks had reference to the paper on this subject, read last June before the Linnean Society, by Dr. A. R. Wallace, and the subsequent discussion. Prof. Meldola pointed out that the question of "utility," as necessitated by the theory of natural selection, had hitherto been made to depend too exclusively upon external and visibly manifest utility, a restriction which he did not believe to be warranted by facts. He argued in favour of a connection of the nature of correlation between apparently trivial external characters and latent physiological characters of great importance to the welfare of the species. From this point of view it was contended that the diagnostic characters used for purposes of description did not truly represent the sum total of the characters which must be regarded as specific. The President concluded by referring to the losses by death during the year of several Fellows of the Society and other entomologists, special mention being made of Mr. A. S. Olliff, Mr. Edward Armitage, R.A., Mr. Peter Inchbald, Miss G. E. Ormerod, Mons. Auguste Sallé, Mr. Arthur Dowsett, Herr Julius Flohr, Mr. J. Chappell, and Dr. Morawitz. A vote of thanks to the President was proposed by Lord Walsingham, F.R.S., seconded by Mr. Osbert Salvin, F.R.S., and carried. A vote of thanks to the Officers was then proposed by Prof. Poulton, F.R.S., seconded by Mr. R. Trimen, F.R.S., and carried. Prof. Meldola, Mr. McLachlan, and Mr. Goss replied, and the proceedings terminated.—H. Goss, *Hon. Secretary.*

February 3*rd.* — Mr. Roland Trimen, F.R.S., President, in the chair. The President briefly returned thanks for the honour conferred upon him by his election, and announced that he had appointed as Vice-Presidents, The Rev. Canon Fowler, M.A., F.L.S., Mr. R. McLachlan, F.R.S., and Professor Meldola, F.R.S. Mr. F. Bates, of 417, High Road, Chiswick; Mr. Dudley d'Auvergne Wright, M.R.C.S., L.R.C.P., of 55, Queen Anne Street, W.; and Mrs. E. Brightwen, of The Grove, Great Stanmore, were elected Fellows of the Society. Mr. Champion exhibited an extensive series of Coleoptera collected by Mr. R. W. Lloyd and himself in July last in the Austrian Tyrol, and containing about 450 species, including thirty-five of Longicornia and about twenty of Otiorrhynchus (the most characteristic beetles in the places visited). He also exhibited about eighty-five species of Coleoptera from Cintra, Portugal, collected by Col. Yerbury during the early spring of 1896, the most interesting of these being *Carabus lusitanicus*, F. Also, on behalf of Mr. W. H. Harwood, two specimens of the rare *Zeugophora flavicollis*, Marsh., from Colchester. Mr. Tutt exhibited, for Mr. H. B. Prince, some Lepidoptera, chiefly Noctuæ, from the Cheshire coast, to show the colour varieties there prevalent. Also, on behalf of Mr. W. H. B. Fletcher, some typical specimens of *Zygæna ochsenheimeri*, Zell., from Piedmont, and some hybrid Zygænids, obtained by crossing *Z. ochsenheimeri* male with *Z. filipendulæ* female. The hybrids were fertile *inter se*, the males of the cross exhibiting very markedly the characters of the male of *Z. ochsenheimeri;* whilst, on the other hand, the females, with two exceptions, strikingly resembled *Z. filipendulæ.* Mr. Tutt also showed, for Mr. J. B. Hodgkinson, a number of obscure British Micro-Lepidoptera, many of which had been regarded as new species. The validity of the determinations was discussed by Lord Walsingham, Mr. B. A. Bower, and others; and the first-named speaker strongly deprecated the practice of positively recognizing or describing such obscure forms, particularly when British, from single or worn specimens. A suffused aberration of a Gelechiid, taken at Witherslack, and described under the name of *Lita intermediella* (Ent. Rec. ix. 36) was referred to *L. fraternella*. Mr.

Barrett showed specimens of the true *Platyptilia tesseradactyla*, L. (=*P. fischeri*, Zell.) new to the United Kingdom, and taken in Co. Galway by Mr. W. F. de V. Kane and the Hon. R. E. Dillon. Mr. McLachlan exhibited cooked locusts (*Schistocerca peregrina*) received from the Rev. A. E. Eaton, and sold in the market of Biskra, Algeria, under the name of "Jarâd." They were cooked whole, but the abdomen only was eaten. A paper was communicated by Dr. A. G. Butler, F.L.S., on "Seasonal Dimorphism in African Butterflies," which led to a long discussion, chiefly on the so-called "dry-season" and "wet-season" forms. Mr. Merrifield stated that he had been unable experimentally to modify the colour and markings of Lepidoptera by variations in humidity. Mr. Tutt believed that Mr. Doherty had obtained "wet-season forms" of Oriental species by keeping the pupæ in a moist atmosphere.

February 17th.—Mr. R. McLachlan, F.R.S., Vice-President and Treasurer, in the chair. Messrs. Champion and Jacoby exhibited the collection of Phytophagous Coleoptera made by Mr. H. H. Smith in Grenada and the Grenadines for the West India Exploration Committee of the Royal Society. Mr. F. C. Adams exhibited rare Diptera taken in the New Forest during the preceding year, and including *Callicera ænea* and *Nephrocerus flavicornis*. Mr. M. Burr showed an example of an undetermined species of locust taken in the Post Office at Bedford Street, Strand, and six new species of Acrydiidæ of different genera. The Secretary exhibited a Cicada larva from which a fungus, probably *Cordyceps sobolifera*, was growing, which had been sent to the Society from Venezuela, with an enquiry as to its real nature. The Rev. Dr. Walker showed a series of Coleoptera, Hymenoptera, and Diptera, collected in the Orkney Islands during the previous season. Mr. Tutt exhibited bred examples of the extreme radiate variety of *Spilosoma lubricipeda*. This variety occurred naturally in Heligoland, and its existence in Great Britain was probably attributable to accidental importation. Mr. Jacoby and Mr. Champion communicated a "List of the Phytophagous Coleoptera obtained by Mr. H. H. Smith in St. Vincent, Grenada, and the Grenadines, with descriptions of new species."—W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*December 10th*, 1896.—C. G. Barrett, Esq., F.E.S., Vice-President, in the chair. Mr. Brooks exhibited a very long series of *Acherontia atropos*, bred from pupæ obtained at Long Sutton this year. One specimen was much lighter on one side than on the other; it was suggested that a deficiency of fluid in the wings through injury was the cause. He also exhibited a very long series of *Triphæna fimbria*, bred from larvæ collected near Rotherham. Many specimens were light, and only very few of the dark form; it was stated that the colour variation was by no means sexual. Mr. Mansbridge, a long and very variable series of *Agrotis auxiliaris* from N. America, taken in 1893; and read a paper on the exhibit, describing the forms of variation, life-history, and distribution of the species. Mr. Barrett, two specimens of *Agrotis subgothica*, said to have been captured by Raddon, of Barnstaple; and also forms of *A. tritici* of the var. *subgothica*. A discussion ensued, in which it was conclusively proved, by reference to Doubleday and others, that the *bona fides* of Raddon could not be relied on. Mr. Adkin read an addendum to his previous paper on *Triphæna comes* (*orbona*), giving more detailed evidence of the occurrence of the species and its var. *curtisii* in various localities. He also exhibited some Shetland forms of *Camptogramma bilineata*, one having a dark fascia, broad and complete, with a pale central blotch. Mr. Dennis exhibited microscopic slides showing the striking distinctions between the antennæ of *Hybernia aurantiaria* and those of *H. defoliaria*.

January 14th, 1897.—R. South, Esq., F.E.S., President, in the chair. Mr. Routledge exhibited specimens of *Acronycta menyanthidis* from Carlisle, with the thorax white; *Xylophasia rurea* from N. Devon, light grey, with fine lines; *Agrotis segetum*, with silvery fore wings and unusually white hind wings; *Noctua c-nigrum*, with the *c* reduced to two spots; and a specimen of *Triphæna pronuba* from Epping, with lunules on the hind wings. Mr. R. Adkin, *Tephrosia crepuscularia*, bred March, April, and (summer brood) June, some of the latter being equal in size to the former; *T. biundularia*, bred May: all from the London district. Also, on behalf of Mr. W. F. de V. Kane, *Dianthœcia capsophila* from a small island off the Kerry coast, with examples from Howth and Isle of Arran (Galway) for comparison; the Kerry specimens were unusually dark for the species, and were bred. Mr. Hewett, of York, a varied series of *Tæniocampa munda* from York, including a fine mahogany-coloured form; a melanic var. of *T.* (*cruda*) *pulverulenta;* a series of vars. of *Abraxas grossulariata*, including var. *varleyata*, bred from a wild larva; the various forms of *Arctia lubricipeda*, including a series of intermediate forms; a preserved larva, from ova laid by a female *T. munda* taken *in cop.* with a male *T. stabilis* at York, 1896; series of vars. of *A. sylvata* (*ulmata*), one being suffused and several unusually free from markings; three females of *Odonestis potatoria* of the male coloration; and three *Saturnia carpini*, one having left hind wing very pale, one very dark male, and a female having hind wings approaching the male coloration. Mr. Barrett, on behalf of Mr. Kane, a specimen of *Boarmia repandata* var. *destrigaria*, *Phothedes captiuncula*, and *Aciptilia tetradactylus*, from Ireland; also a series of *Eupithecia consignata*, bred "in and in" continuously since 1874, and only on one occasion, some ten years ago, had a wild strain been introduced; at first they gradually deceased in size, but after the introduction of a wild strain and the sleeving-out process, they increased both in size and depth of colour. Mr. Tutt, a long series of *Acherontia atropos*, bred by Mr. Borroughs, of Rainham, showing considerable variation in the colour of the "skull." He did not consider the species adapted to exist in this country; the specimens exhibited had been forced. Mr. McArthur, a living larva of *Aplecta occulta*, and a bred series of *Heliothis peltigera*. Mr. Young, of Rotherham, very long series of *Spilosoma lubricipeda*, var. *zatima*, and var. *fasciata*. To illustrate his paper, Mr. Hewett exhibited very long series of both broods of *T. crepuscularia*, and also series of *T. biundularia ;* these were from some fifty or sixty different localities. Most of the known forms were shown, as well as preserved larvæ. On behalf of Mr. de V. Kane, the latter species from Irish localities; and both species from Swansea, on behalf of Mr. Robertson. He then read a most exhaustive paper on these two species, and included in it were the observations and experiments of more than fifty well-known entomologists, who had been interested in this question. In the discussion which followed, Mr. South asked: (1) Did any character exist by which the species could be separated with absolute certainty? (2) Which was the commoner species? To the former no answer was forthcoming; but to the latter members agreed that *T. crepuscularia* was very local, while *T. biundularia* was more common. Mr. Barrett was of opionion that as a result of Mr. Hewett's paper all distinctions between the two were swept away. Mr. Tutt insisted that the naming of the two forms and the consideration of them as distinct, although very closely allied, was a matter of convenience, necessitated in our comparisons with continental and Asiatic representatives. Messrs. Carpenter, Bacot, and others continued the discussion.

January 28*th*.—The President in the chair. This was the Annual Meeting, and devoted to receiving the Report of the Council, the reading of the balance sheet, and the Address of the retiring President. The Officers and Council elected for the ensuing year were:—President, R. Adkin, F.E.S.; Vice-Presidents, R. South, F.E.S., and J. W. Tutt, F.E.S.; Hon. Treasurer, T. W. Hall, F.E.S.; Hon. Librarian, H. A. Sauzé; Hon. Curator, W. West (Greenwich); Hon. Secretaries, Stanley Edwards, F.L.S., F.E.S., and Hy. J. Turner, F.E.S.; Council, Messrs. C. G. Barrett, F.E.S., A. W. Dennis, H. S. Fremlin, F.E.S., W. Mansbridge, F.E.S., A. W. Mera, Hy. Tunaley, F.E.S., and Col. C. E. Partridge. Mr. South then delivered his Address. After referring to the excellent position which the Society still continued to maintain in membership and usefulness, as well as in its finances, he pointed out various practical lines of study which members of the Society might take up. He spoke of the extraordinary interest shown in natural history by the general public, as evinced by the success of so many recent publications on the subject. After enumerating the new additions to the British fauna, he remarked on the growing interest taken by British entomologists in European Lepidoptera. In reference to the study of variation, he considered that more attention might be paid to the geographical distribution of varieties. He stated that classification seemed to be in a state of chaos, the several works recently issued on Lepidoptera differing very materially in nomenclature and arrangement.

February 11*th*.—R. Adkin, Esq., F.E.S., President, in the chair. Mr. Barrett exhibited specimens of a species new to Britain, *Platyptilia tesseradactylus*, taken by Mr. de V. Kane in the West of Ireland; the specimens were greyer than the usual German form. Mr. Routledge, a fine var. of *Dianthœcia conspersa*, bred from Orkney; it was generally ochreous, the usually white markings being grey. Mr. Tutt, dead larvæ of *Hepialus lupulinus* which had been attacked by a fungus; living larvæ were also shown which had nibbled the dead ones. On behalf of Mr. Fletcher, of Worthing, he exhibited a series of hybrid Zygænidæ, from continental *Z. ochsenheimeri* and British *Z. filipendulæ*, which hybrid race was perfectly fertile. Also, on behalf of Mr. Prince, of Cheshire, a large box of common species, showing the local forms and range of variation; among these the *Nyssia zonaria* was most interesting for the variation in the transverse lines. And, on behalf of Dr. Chapman, the living larva of *Bryophila perla*, showing its silken gallery to which it retires during the day; it was noted that the species did not hybernate, but fed all the winter. Mr. McArthur, a specimen of *Aplecta occulta*, just bred from a Rannoch larva. Mr. Adkin, a series of the same species, part taken and part bred from larvæ taken at the same locality; they were of good size, and very darkly marked. Mr. Perks, specimens of the "jumping bean," a Mexican fruit containing the larvæ of *Carpocapsa saltitans.* The remainder of the evening was devoted to the exhibition, by means of the lantern, of some sixty photo-micrographic slides of insect anatomy, by Mr. F. Clark aided by Mr. Furneaux, F.R.G.S.; some of the prepared objects from which slides had been made were kindly lent by Mr. W. West, of Streatham. Mr. Clark first showed, by means of diagrams, his method of making the slides; and then went on to exhibit various forms of antennæ, the tracheæ, several forms of the tongue, the compound eye, scales of Lepidoptera, hairs of common larvæ, and a most interesting series of the parasites of man and animals. The large screen used had been bought by Mr. Edwards, and most kindly presented to the Society, which is now admirably equipped with a lantern and all appliances for demonstration purposes.—Hy. J. Turner, *Hon. Report Sec.*

Lancashire and Cheshire Entomological Society.—*December* 14*th*, 1896.—Mr. S. J. Capper, President, in the chair. A paper was read by Dr. J. Harold Bailey entitled "Notes on a Day's Beetle Collecting in Shropshire," in which he recounted the various species taken, and stated it was a ground over which the late Charles Darwin had often worked for coleopterous insects. Mr. H. B. Prince also read a paper entitled "Experiences in Lepidoptera in 1896." The author, after referring to the general scarcity of insects during 1896, especially in the autumn, drew attention to the controversy now going on as to whether Lepidoptera were over-collected to the point of extermination, which led to considerable discussion. Mr. Pierce stated that no one who had ever visited the fen district, or such places as Barnwell Wold, could for a moment believe that over-collecting could account for the disappearance of *Polyommatus dispar* or *Lycæna arion.* Liverpool entomologists, he said, were especially favourably situated for observing local species, and mentioned *Nyssia zonaria*, which in some seasons was so abundant that it was impossible to walk without treading on larvæ at each stride; yet every now and then the species had gradually disappeared entirely from a locality, and would certainly have been lost had it not been re-introduced by Mr. Gregson and others. *Bombyx trifolii* was very similar. Efforts to re-establish *Lycæna arion* and *Orgyia dispar* had entirely failed, even for one season, although the experiment had been tried with the latter many hundreds of times in different parts of the country; the opinion of those present being that it was not to man, but to other agencies, that the disappearance of certain species from Great Britain was attributable. Dr. Bailey exhibited a large number of Coleoptera, the result of the day's collecting. Mr. Prince, Lepidoptera to illustrate his paper. The President, a long series of *Argynnis paphia* and *Melitæa artemis.* Mr. Pierce, *Vanessa c-album* and var. *hutchinsoni.* Mr. Webster, pieces of wood infested by *Cossus ligniperda* from a garden at Huyton.

Annual Meeting, Monday, January 11*th*, 1897.—The President, Mr. S. J. Capper, in the chair. Mr. F. N. Pierce, Hon. Sec. *pro. tem.*, read the Report of the Council, from which it appeared that nine meetings had been held during the past year, at which valuable papers had been read, and many interesting exhibits shown. The following officers were appointed for the ensuing year:—President, Mr. S. J. Capper. Vice-President, Rev. F. Freeman. Hon. Secretary, Mr. F. N. Pierce. Hon. Treasurer and Librarian, Mr. H. Locke. The following gentlemen were elected on the Council:—Mr. W. E. Sharp, Dr. J. W. Ellis, Messrs. W. Webster, B. H. Crabtree, and Douglas Walker. The President, in his Annual Address, said:—

"On the 21st of next month the Lancashire and Cheshire Entomological Society will have attained its twentieth anniversary. The first meeting was held at my house, Huyton Park; it then numbered only eleven members, *viz.* Messrs. N. Cooke, Mountfield, N. Greening, T. J. Moore, Birchall, Carrington, Roxburg, Whitby, Johnson, Cross, and myself. Twenty years in the retrospect is a long period, but it has passed so quickly that I find it difficult to realise so long a time has elapsed since that happy occasion. The meeting at my house had been anticipated by one at Mr. Nicholas Cooke's, Wallasey, Cheshire, a few weeks previously, at which, however, I was not present, when the formation of such a Society was determined upon, and the office-bearers proposed, and Mr. Cooke was requested to ask me to become President. When Mr. Cooke informed me of all this I was much surprised, but at nothing more so than at my being selected to occupy such an honourable position. I told Mr. Cooke that he was the right man for that office, but at his persuasion I agreed to accept it for one year, but only conditionally, that he undertook to do so the next. Strange to say, circumstances happened to prevent this, and I find myself, after nineteen years, still your President. On similar occasions I have urged upon you the desirability of choosing some other member than myself to preside over you, and three years ago stated that, having given so many inaugural addresses, I felt myself exhausted for new material, so that if you persisted in electing me I must at any rate be relieved from this duty. Two years ago our then Vice-President, Mr. W. E. Sharp, kindly gave the address. Those present when he did so, or those who have perused it in its printed form [Entom. xxvii. 81], will remember the originality and the new lines of thought it evoked,—how, in his introductory remarks, he stated that 'Entomology is at best but a partial science, and is only a small fragment of the great science of Biology, and yet Entomology and Entomologists existed before ever Biology, under that name, was invented.'

"Let us very briefly glance over the progress made by the Society, the kind of work which has occupied its attention, and at a few of the many lectures given and papers read at its meetings during these nineteen years of its history. The next meeting after the one at my house was held March 26th, 1877, in the room we now occupy, the use of which was kindly granted us by the Museum Committee. The number of new members joining us was considerable, so much so that I find no less than fifty-seven members recorded in the first printed Annual Report for the session 1881. It is interesting to state that no fewer than sixteen of these are still members, *viz.* R. Brown, H. Capper, J. R. L. Dixon, Dr. Ellis, E. D. Jones, W. C. Gardner, J. T. Green, W. Johnson, S. L. Mosley, F. N. Pierce, T. Roxburg, W. E. Sharp;

E. P. Thompson, J. Vicars, R. Wilding, and myself. Whilst it is gratifying to find that so many old members are still with us, it is sad to state that eleven of those fifty-seven are since dead, many amongst whom were much-loved friends of my own, and such as are irreplacable.

"At present we have sixty-nine members, so in this respect are in as flourishing a condition as ever; but for the past year or so the attendances at our meetings have not been such as we could desire. Nothing is more discouraging, when a good lecture or paper is brought before the meeting, than to find only a poor audience. I would, therefore, urge upon each member who desires the continued prosperity of the Society to consider the second Monday in the month an engaged evening, and by his presence prove his interest.

"Considering the very great attention that has been given in late years as to the cause of melanism in Lepidoptera, and the numbers of papers that have since been read before societies like our own, or published on the subject, it is most interesting to state that at the first meeting of our Society our then Vice-President, Mr. Nicholas Cooke, read a paper on the subject. He drew attention particularly to the great change that had taken place, and that within a very few years, in several species of Lepidoptera in Delamere Forest, drawing attention specially to *Amphidasys betularia* and *Tephrosia biundularia*, which from almost white forms had become almost black. His suggestion that this was owing to a very large extent to the chemical fumes and coal smoke appears probable, though not in the way that any of us, with the exception of himself, thought, owing to a chemical deposit in the food so affecting the larvæ; for if I remember rightly those who took part in the discussion were of the opinion that the smoke discoloured and darkened the branches and the foliage of the trees, rendering the light forms more conspicuous to their enemies, so leaving the darker forms to propagate their species. His paper was published in the 'Entomologist,' vol. x. p. 92, and led to a very lengthy discussion, in which Dr. Buchanan White, Mr. E. R. Robson, and others took part; nor do I think that we have even yet arrived at a satisfactory conclusion, notwithstanding the investigations of Lord Walsingham in 1884, and Mr. Tutt's exhaustive treatise on 'Melanism and Melanochrism,' published October, 1891. My point is that our Society was the first that paid much attention to this interesting subject.

"This was soon after followed by a lecture on the Genital Armature of the Lepidoptera, by Mr. Benjamin Cooke. I believe Mr. B. Cooke was the first person who called attention to this subject, and at this lecture he gave us his experience of many years' investigations. I remember how interested we all were, but we had no microscopic lantern to illustrate his remarks, but simply a pocket lens. Mr. Cooke had acquired a great deal of valuable knowledge on the subject, having devoted to it many years of careful study and thought. It was his intention, when more satisfied with his conclusions, to make them known to the public, but his premature death deprived the world of the results of his valuable researches, not only in this department, but also in many others of equal interest. It has been my privilege to enjoy the society and friendship of many men taking the highest position as entomologists, but I think I never met with a keener and more thorough scientific observer than Mr. B. Cooke, and with one who had so much knowledge of insect-life generally; and yet unfortunately he has left hardly any record of all his life's work. Some few years after this lecture, Dr. Buchanan White published his observations on the subject in the 'Transactions of the Linnean Society.' Most interesting is it, however, to state that, without the knowledge of the work that had been done in this direction by others, our Secretary was engaged in the same study, and by his lectures before our Society, and literary communications on the subject in our magazines, has made himself famous in the entomological world. It is not my place on the present occasion to do more than thus allude to the work done by Mr. Pierce. Almost the last lecture given at our Society was a most interesting one by him on that subject, a lecture that makes us proud of such a member.

"The interesting paper 'On the Wings of Insects,' by Mr. C. H. Hesketh Walker, October 25th, 1886, and published in the 'Young Naturalist,' is one of great originality of thought, and has led to much investigation, being indeed a new theory on the development of the wings of insects, based upon very careful microscopic study. This, like the 'Genital Armature' of Mr. Pierce, opens up subjects for endless enquiry.

"Familiar as most of us now are with the works of the late Dr. Darwin, twenty years ago his ideas were neither understood nor appreciated as they are at the present time. Converts, however, had been increasing, especially amongst men of science, since the publication of the 'Origin of Species,' in 1859. This has gone on up to the present date, when it is rare to meet with a man of culture who is not one of Dr. Darwin's disciples. We shall therefore expect to find papers on this subject; nor are we disappointed. Amongst others, Dr. Ellis, on Aug. 28th, 1878, read us a paper on 'Darwinism: its Relations to Entomology'; on June 26th, 1882, the Rev. S. Fletcher Williams one, on 'Darwin and Darwinism'; and on Oct. 29th, 1883, Mr. Henry Capper, 'Darwinism and Beauty.' These papers were all thought worthy of publication, and each led to most interesting and instructive discussions at our meetings.

"As a student of the Homoptera we have, as a honorary member, Mr. Robert Newstead, of Chester, who for a number of years has contributed original papers on his investigations of the British Coccidæ, dealing fully with the habits, metamorphoses, and structural characters of these obscure and little-known insects. In his first paper, read in 1890, Mr. Newstead described, as new to science, *Dactylopius walkeri*, K., *Eriococcus insignis*, N., and *Ripersia fraxini*, N., all of which he had himself discovered in Cheshire. During the years which have followed, Mr. Newstead has published, in the Ent. Mo. Mag., a series of papers on 'British and Foreign Coccidæ,' and quite recently has communicated a paper to the Entomological Society of London on 'New Species of Coccidæ collected by the Rev. A. E. Eaton in Algeria.' When we consider the amount of work Mr. Newstead has gone through in connection with the museum at Chester, we may well wonder how it is he has been able to describe over forty new species of scale insects, and clear up the synonymy of many doubtful species. All his diagnoses are clearly given, and accompanied by carefully prepared drawings, which add much to the value of his contributions. Many of us remember with pleasure Mr. Newstead's exhibition of coloured drawings intended for the first Revisional Monograph of the British Coccidæ, which, I am glad to say, the Ray Society will shortly publish. The volume will be a valuable contribution to our entomological literature.

"Mr. Newstead's abilities as an ornithologist are also well known, and his bird-groups have gained for him a world-wide reputation. In this connection I must mention a paper he contributed to our Society on 'Insects found in Birds' Stomachs,' which was the result of some 500 *post-mortem* examinations. Over-pressure of other work has prevented the publication of this contribution, but I am assured it will appear in due course. But in order that we may gather somewhat of the nature of his observations, Mr. Newstead has favoured me with one of his charts, which is of importance, as it clearly shows the economic value of his investigations.

"Most of my Addresses to you in the past have more or less treated on Economic Entomology, as it is a subject in which I take much interest; and we have had numerous papers bearing on the subject, notably those by Mosley, Chappell, Thorpe, and Gregson, which have all contained much valuable information and led to much discussion; whilst for a considerable period Dr. Ellis, who was then our Secretary, acted as Recorder of Economic Entomology for the counties of Lancashire and Cheshire. The past twenty years have witnessed wonderful strides in the lines of Economic Entomology, especially in the American States, Canada, and Australia; but these countries do not immediately concern our Society, though we hail with pleasure the efforts of such men as Prof. Riley, Prof. French, and our hon. member Prof. Fletcher, who have done so much to make this branch of our study a practical science. The latter gentleman, by his kindness in forwarding to our Society his publications, keeps us informed of the vast work done at the experimental farms in this branch. But what has been done in this line in our own country mostly concerns our Society, especially when we remember that some of our own members have taken no mean part in the work. Miss Ormerod commenced her work in 1877, by the issue of a pamphlet (eight pages) calling attention to certain insects more or less generally injurious, and her yearly Reports, ever increasing in bulk, interest, and usefulness, have appeared regularly ever since. It is to the indefatigable and disinterested efforts of that lady that this subject owes the position that it occupies in this country to-day, which, though far from what we would like, and very inadequate to the importance of the subject, is certainly much in advance of what it was when this Society came into existence. If nothing further had been done than Miss Ormerod's elaborate Reports on the Warble Fly and the Turnip Flea Beetle, these amply testify to the usefulness of the work, the former pest particularly having been considerably reduced and almost exterminated in some districts, in consequence of her instructions having been followed out. It is a matter to be regretted that in this very useful work Miss Ormerod should have received no support from the Government of this country.

"Some Reports, commenced in 1886, have been issued from the

Board of Agriculture, and papers on injurious insects are continued by Mr. Whitehead in the 'Journal of the Board of Agriculture,' but a good State Entomologist is yet a desideratum in this country.

"The Royal Agricultural Society in 1889 determined to employ a young man, and allow him to train himself for the work; but after he had issued one Report, severely criticised by Miss Ormerod, he seems to have disappeared. The old Collection of Injurious Insects fitted up by the late Andrew Murray at Bethnal Green Museum has been remodelled by the late Prof. Westwood and our member Mr. Mosley, and placed in the South Kensington Museum. Similar collections have been placed in the Government Museums at Kew, Dublin, and Edinburgh; and the subject has been taken up by several county councils, particularly Cheshire, where another of our members, Mr. Newstead, has made himself exceedingly useful in lecturing on the subject.

"Perhaps the most valuable work that has engaged the attention of our Society has been the compiling of the Lepidoptera Fauna of Liverpool and neighbourhood, and the Coleoptera of Liverpool and neighbourhood. This undertaking was commenced in 1882, and to Dr. Ellis, who acted as editor, the greatest credit is due. It is only a few days since Mr. Barrett, writing to me, said how much he valued and how frequently he referred to our Lepidoptera Fauna as to localities for his work on British Lepidoptera, which will probably be the text-book for the next generation. Mr. Sharp is engaged in preparing similar catalogues on the Hemiptera-Heteroptera; whilst Mr. W. Gardner is preparing one on the Hymenoptera. These catalogues, I understand, will all be based on the original lists we now possess, prepared by our late member, Mr. Benjamin Cooke; they are added to year by year, and so kept up to date.

"Very briefly have I this evening glanced at some of the work we have accomplished during the past twenty years. There is every cause for congratulation and encouragement. We have been far from an idle Society, and the work that we have done has been of the greatest scientific importance. From its commencement no fewer than 196 papers or lectures have been given, the greater part of which dealt with new and important subjects relating to entomological science. For twenty years our meetings have been held with the utmost regularity, and the ever-increasing interest in Entomology has been marked by constant additions to our ranks. Most of the old school of naturalists have been removed by death, leaving their empty chairs to be filled by those of new energy; and I would, therefore, again urge our younger members to assiduous and careful work, not merely in the collecting of specimens, but in a better and more perfect understanding of the science.

"To the younger worker our library is open for reference; he will find there most of the text-books and standard works upon Entomology, together with periodicals devoted to our particular science for the past twenty or thirty years.

"Finally, in making a retrospect glance at the rise and progress of the Society, I see every cause for congratulation on the self-evident success of a career extending over a fifth of a century. We have no cause to be ashamed of our labours; and I have no hesitation in saying that few scientific societies can boast of a better record of original and useful work than the Lancashire and Cheshire Entomological Society."

February 8th.—The President, Mr. S. J. Capper, F.L.S., F.E.S , in the chair. The Rev. R. Freeman gave a lecture entitled "Elementary Biology and Anatomy of Insects," in which he traced the connecting links from the protoplasm amœba to the perfect insect, describing in detail the organs of nutrition, the nervous system, breathing organs, &c., of insects. The lecture was fully illustrated by diagrams from the author's preparations. Mr. John Watson, of Manchester, exhibited specimens of *Belenois teutonia* and *B. nisea* from Australia, and showed transitional forms from the New Hebrides, proving that these two species must now be considered as only local forms of the one. He also showed *Eurycus cressida* and form from North Queensland. The Rev. A. M. Moss exhibited a curious bronze-coloured variety of *Amphidasys prodromaria* captured by himself at Windermere. Mr. Gregson, a box of asymmetrical specimens of Lepidoptera, the collection including two fine varieties of *Arctia caia* the fore wings of one specimen being very different.—F. N. Pierce, *Hon. Sec.*

Cambridge Entomological and Natural History Society.—*January 15th*, 1897. The President, Dr. Sharp, in the chair. Mr. Fleet exhibited a good specimen of *Cleonus nebulosus*, a large weevil, from the crop of a stone-curlew purchased in the market. It was suggested that a probable locality for both bird and beetle was Brandon. Dr. Sharp exhibited a fine mass of the cocoons of *Aphomia sociella* picked up in the neighbourhood; also some remarkable dipterous larvæ, *viz.* an undescribed *Tabania* larva, from the New Forest, with feet disposed all over the body, and somewhat allied to *Tabanus spodopterus* (he thought it might be a larva of *Atylotus*); larva of *Scenopinus fenestralis* from Bucks (he called attention to the importance of ascertaining whether this larva is injurious as commonly supposed, or whether it is present in woollen goods only to destroy other larvæ, such as those of the clothes-moth); larva of *Microdon*, found in Portugal by Colonel Yerberry, which shows no sign of segmentation; also *Idolothrips spectrum*, sent by Mr. Froggatt from New South Wales.

January 29th.—The President in the chair. The President exhibited a specimen of a large click-beetle of the genus *Chalcolepidius*, and showed that if the anterior parts were separated from the afterbody and then replaced, the front part would be propelled to a distance from the body; he therefore concluded that the explanations ordinarily given of the jumping of the click-beetles was unsatisfactory; and he suggested that it might be found that the act really depended on an elasticity arising from the mode in which the parts of the mesothorax and elytra were shaped and fitted together. Mr. Rickard read a paper upon "Jumping Beans." He said that probably the larva, after consuming all the internal portion of the seed, attacked the shell; in this endeavour to obtain food it pulls at the remaining shell, and the efforts supply the motive-force to which the jumping is due. He thought that the actual motion was merely mechanical, and determined by the formation of the euphorbiaceous seed.

Birmingham Entomological Society. — *November 16th*, 1896.—Mr. G. T. Bethune-Baker, President, in the chair. Exhibits :—By

Mr. W. H. Wilkinson, a collection of insects made in the Madeira and Canary Islands in February, March, and April, 1896, he gave an account of his visit to the Islands and of the collection. He visited Funchal, Madeira; Orotava, Teneriffe; and Las Palmas, Grand Canary; Orotava being the best collecting ground. He found *Anosia plexippus* and *A. chrysippus* very plentifully, especially the former, in Grand Canary; *Vanessa callirhoë* was also common in Grand Canary; *V. cardui* and *V. huntera* both occurred; *Gonopteryx cleopatra* was common, and many others. Mr. Bethune-Baker said that the most interesting species in the collection were *Pararge xiphia* from Madeira, and *P. xiphioides* from Grand Canary, two closely allied but distinct species, peculiar to the Madeiras and Canaries respectively; also *Lycæna webbiana*, of which there were four specimens, an interesting little species restricted to the Canaries. He called attention to the fact that the *G. cleopatra* from these islands differed decidedly from the Mediterranean form of the species. He also showed series of *Pieris brassicæ*, of *P. wollastoni* from Madeira, and *cheiranthi* from Canary, and pointed out the curious fact that *wollastoni*, although nearer to the European *brassicæ* than *cheiranthi* is, is yet the more widely divergent species; also a series of *Lycæna webbiana*, and of *Anthocharis charlonia* from Algeria, a species which he said also occurred in the Canaries. Mr. Kenrick said that the most curious feature in the Canary Islands fauna was the occurrence of American forms; *V. huntera* occurred only in the Canaries and America; and *A. plexippus*, which is common in the Canaries, is an American species. Mr. Bethune-Baker said that in working at the moths he noticed American affinities in several groups, particularly in the genus *Phlogophora*, which was much more closely allied to American than to European forms. By Mr. Bradley, for Mr. J. W. Moore, a remarkable variety of *Arctia caia*, bred from a lot of larvæ collected locally and reared under natural conditions; the markings were all in their usual positions and shapes, but the whole insect was of a rich dark brown, the markings on the under wings showing black, and on the upper wings a lighter brown. By Mr. J. T. Fountain, *Melitæa artemis* from Umberslade; a bleached specimen of *Epinephele ianira* from Wyre Forest; a specimen of *V. io*, from Kniver Edge, the two sides of which were unequal in size; a specimen of *V. atalanta* with white spots in red bands, from Bournemouth, and another from Himley, near Dudley, with the red bands broken; a specimen of *Apatura iris* in which the bands of the posterior wings on the upper side were small and bent inwards, and on the under side only shown as paler bars, not white ones; the under sides, too, were very slightly marbled, nearly plain, with less white on the fore wings than usual; the purple iridescence on upper sides could be seen on all wings at once, not on only one side at a time as usual. By Mr. W. Bowater, a lot of butterflies, unnamed, collected about 500 miles up the Niger river. Mr. Kenrick said that one *Pieris* seemed to be new to him. By Mr. H. Taylor, *Luperina cespitis* from Yardley, *Eugonia erosaria* from Wyre Forest, *Tethea subtusa* from Wyre, and *Cirrhœdia xerampelina* taken this autumn at Steckford. By Mr. Bickley, *C. xerampelina* from Steckford. By Mr. C. W. Wynn, *Gortyna flavago* from Sutton, *Neuronia popularis* from Yardley, *Oporina croceago* (a bred series from

Wyre Forest); *Trichiura cratægi* from Wyre, *Asphalia diluta* from Sherwood Forest, and *Calocampa exoleta* from Sutton. By Mr. C. H. Kenrick, *Tephrosia crepuscularia* and *T. biundularia;* he expressed the opinion that they were but one species, and that locally it was single-brooded and consisted of light and dark forms mixed. By Mr. H. Foster Newey, a number of drawings of larvæ. A communication from Mr. R. W. Fitzgerald was read, giving a list of the Macrolepidoptera collected and observed by him within a radius of four miles of Uley, near Dursley, Gloucester. It contained the names of 286 species, and included *Vanessa antiopa* (taken on Nov. 3rd, last), *Chærocampa porcellus* (abundant in 1896), *Setina irrorella* (one), *Xanthia aurago* (common in 1895), *Polia flavicincta*, *Chariclea umbra* (one at sugar in 1896), *Phibalapteryx tersata*, and *P. vitalbata*, &c. By Mr. R. C. Bradley, a collection of Diptera made at Bournemouth during the first fortnight of August, 1896; it included *Geranomyia unicolor*, *Xanthogramma ornata*, *Myopa fasciata*, *Miltogramma punctata*, and *M. conica*, *Idia lunata*, &c.; the last species was formerly considered doubtfully British by Mr. Verrall.

December 21*st*.—The President in the chair. Exhibits:—Mr. Bethune-Baker, for Mr. Abbott, three female specimens of a *Lycæna* taken by Mr. C. B. Antram at Upfield, Sussex; they were suffused with blue, and were believed by the captor to be hybrids between *L. icarus* and *L. agestis*. Mr. Bethune-Baker said they were a not unusual form of the female of *L. icarus*, which he had from several localities. By Mr. R. C. Bradley, *Emmelesia ericetata* from Inverness-shire, &c. By Mr. Abbott, a fine bred series of *Agrotis ashworthii;* they had been reared from eggs laid in 1896 by a bred female, and had been forced through. He also showed a yellowish form of *Arctia caia*, and a specimen of *Spilosoma fuliginosa*, in which the black markings of the hind wings had been splashed across the fore part of the wings. By Mr. Martineau, a very fine photo slide, by R. W. Chase, of larvæ of *Sphinx ligustri*. By Mr. Bethune-Baker, spiders taken by Mr. W. H. Wilkinson in the Canaries and Madeiras.

January 18*th*, 1897.—The President in the chair. Mr. A. E. Cutler, 13, Portland Road, Edgbaston, was elected a member of the Society. Exhibits:—By Mr. A. H. Martineau, *Crabro interruptus* from Solihull (one specimen, taken June 14th, 1896), and *Bombus latreillellus* var. *distinguendus* (taken at Sutton in June last). By Mr. R. C. Bradley, *Lophyrus pini* (one, bred, from Sutton). By Mr. Bethune-Baker, two cases of palæarctic Papilios, with nice series of all six species, including var. *feisthamelii* of *Papilio podalirius* from Algeria, &c., var. *latteri* from Algeria, var. *zanclæus* from Greece, and *P. machaon* from the British Isles, Italy, &c., those from the south being darker. By Mr. P. W. Abbott, a very fine variety of *Argynnis euphrosyne* from Wyre Forest, taken by Mr. H. McNaught; on the upper side the outer two rows of spots on the fore wings were much enlarged longitudinally, and on the hind wings all the black markings were much enlarged and suffused, so that they were very dark; on the under side the black markings had almost disappeared, the fore wings being pale with indications only of markings; on the hind wings all the basal two thirds were pale yellow, the outer third being orange; the black markings were gone, and the silver ones lengthened out radially. He also showed a fine example of *Fidonia atomaria* from Shirley Common, taken by Mr. C. B. Antram in June, 1896; it was of a uniform dark brown above and below.

February 1*st.*—*Annual Meeting.*—The President in the chair. The Annual Reports of the Council, the Treasurer, and the Librarian were presented. Mr. Bethune-Baker was re-elected President; Mr. P. W. Abbott, Vice-President; Mr. A. H. Martineau, Librarian; Mr. R. C. Bradley Hon. Treasurer; and Mr. C. J. Wainwright, Hon. Secretary. Exhibits:—Mr. J. T. Fountain, *Cirrhœdia xerampelina* and *Luperina cespitis*, both taken in the Pershore Road, close to Birmingham; also *Erebia blandina* from Aberdeenshire, and a number of Swiss Erebias and other Rhopalocera. By Mr. P. W. Abbott, a series of *Cucullia chamomillæ* from Sutton, at various dates; they were all very dark specimens, excepting one, which was taken in 1894 and was rather small and very pale. By Mr. Cutler, specimens of *Arctia caia*, one pale and one very dark, but crippled; both from the same batch of larvæ, and reared together.—Colbran J. Wainwright, *Hon. Sec.*

North London Natural History Society.—The fifth Annual Exhibition was held in the Lecture Hall at the N.E. London Institute, on Saturday, January 2nd, 1897. The exhibits were, if anything, even more numerous than last year. The entomological department was, as usual, the best represented, but botany was also very much to the fore. Lantern illustrations were once more on view, Mr. Wattson contributing "Life in a Pond," and Dr. Gerard Smith attracting great attention with photo-micrographs illustrative of plant morphology, marine zoology, &c. Short lectures were delivered during the evening, by Mr. Bacot "On behalf of Insects," by Mr. Wattson on "Pond Life," and by others. The exhibition was unanimously admitted to be the best the Society had yet held.—Lawrence J. Tremayne, *Hon. Sec.*

The Entomological Club.—Since our last report the following meetings of the Entomological Club have been held, namely:—On July 7th, 1896, at the residence of Mr. Samuel Stevens, when the time-honoured "strawberry feast," which in the olden days was held annually in the neighbourhood of the then prolific hunting-ground of Birch-wood Corner, was duly celebrated; on November 24th, at the residence of Mr. Robert Adkin; and on January 19th, 1897, at the Holborn Restaurant, when Mr. G. H. Verrall entertained representatives of leading entomological associations and others, to the number of about fifty. At this meeting a resolution was unanimously passed by the members present that the Club collections should be placed in the custody of the South London Entomological and Natural History Society. These collections contain, among other interesting material, certain type specimens, and it is hoped that when deposited with the above Society their usefulness will be increased by their being more easily accessible than is now the case.

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ON THE SUBORDINATE INFLUENCE OF CLIMATAL CONDITIONS IN DECIDING THE MORPHOLOGICAL CHARACTERS, WITH SPECIAL REFERENCE TO THE RHOPALOCERA.

By W. HARCOURT-BATH.

THE preponderating influence of the organic environment in determining the distinctive or morphological characters of the Rhopalocera is probably much less apparent than real. It is, however, a more difficult task to prove than its influence with respect to their geographical and vertical distribution. Nevertheless, I am perfectly convinced myself that the climatal conditions similarly play only a subordinate part in the matter, and what effects derive their origin from the physical environment do not possess the determining factor, and only operate upon the organism indirectly.

I will endeavour to support this hypothesis by certain facts and conclusions which I have obtained during the course of my investigations respecting the various problems connected with their vertical distribution.

I will first of all add a few words to the article by my pen which appeared in the December (1896) issue of the 'Entomologist' with reference to the latter subject. The conception I have formed of the phenomenon presented by the various zones of vegetation, with their accompanying fauna, stretching from the equator upon either side to the two poles, and likewise from the bases of the various mountain chains to the line of congelation, is that it represents a somewhat parallel or analogous case to the phylogenetic and ontogenetic stages in the progress respectively of genera and species. This is, of course, not strictly the case, but it represents in a very fair degree the changes that have been going on during past ages, and are still proceeding. The different zones of vegetation which one meets with in ascending a mountain therefore present, in my mind, their respective antiquity—by no means accurately so, as I have already said; but the higher one ascends the more ancient will become the prevailing constituents of the flora of each particular phyto-geographical belt, together with its accompanying fauna. The higher zones constitute, as it were, the final sanctuaries of many species which are unable to modify their characters in harmony with the ever-changing organic conditions by which they are surrounded, and are practically in the same position as islands. As new conditions manifest themselves at the bases of the mountain chains from time to time, in the appearance of new types of animals and plants with more highly specialized powers of adaptation, they will make their presence felt all along the line from the bases upwards, the constituents of each zone rebounding, as it were, on the one above, like waves upon the sea-shore, the more ancient in turn succumbing to the next in the order of succession. A typical instance of this change, independent of any apparent alteration in the climatal conditions, is to be found in the Scandinavian peninsula at the present day, where the existing flora of the lower zones is gradually receding before an Oriental one, which is slowly but surely making its way westwards from Siberia. Some remarkable changes of a somewhat similar character concerning the arboreal vegetation have also occurred in Denmark within historic times.

Such evolutions as these must be affecting the distribution of the Rhopalocera to a considerable extent, for the larvæ, being dependent upon the plants for their sustenance, will either have to retreat with their pabula, or succumb, unless they can conform themselves to their altered surroundings. Temporary fluctuations or return waves will periodically manifest themselves, such, for instance, as the clearly ascertained fact of the comparatively recent more elevated extension of the pine forests in the Alps, and this will react upon the zones below, together with their insect inhabitants, in the manner I have endeavoured to exhibit.

The organic environment therefore clearly plays a preponderating part in the distribution of organisms, while that of the physical only a subordinate one, and this generally in an indirect manner. While the former will operate almost exclusively in curtailing their distribution downwards, the latter will exert its influence principally in deciding their upper rather than their lower limits. Another important item worthy of special consideration and investigation by biologists is the fact that the vertical and horizontal conditions affect the flora in a different degree to that of the fauna. In the former kingdom whole tribes and families seem to be similarly affected in respect to their distribution, whereas in the latter the environmental influence seems principally confined to species. While we thus have whole genera of plants confined to particular zones upon the mountains, the same in the case of animals may be completely cosmopolite. This conclusion will be very evident to those who have made a special study of their vertical distribution in the Alps, and is particularly so in the case of the Rhopalocera.

Thus in the latter all the principal genera are cosmopolite, or nearly so. Consider, for example, *Pieris*, *Colias*, *Lycæna*, *Vanessa*, *Melitæa*, *Argynnis*, *Erebia*, *Pararge*, *Cœnonympha*, *Syrichthus*, and *Hesperia;* while others—such, for instance, as *Papilio* and *Polyommatus*—also possess a very wide range in respect to altitude. On the other hand, the various genera of plants are often considerably very circumscribed in their distribution, frequently being confined to only one or two zones upon the mountains. The inference to be drawn from these facts seems to be that the organic environment acts more powerfully in the case of the animals, the physical conditions manifesting their influence to a somewhat greater extent in the plants.

Now let us consider a few facts concerning the relationship between altitude and morphology.

It is too readily taken for granted similarly that butterflies owe their remarkable diversity of colours and patterns to the direct influence of the climatal conditions.

Much has been written on this subject by Dr. A. R. Wallace in favour of the preponderating influence of the organic environment. It is my intention in the present paper to confine my attention to two phases only, namely, melanism and ocellation, with special reference to the alpine Rhopalocera.

As regards the first of these, many hypotheses have been from time to time put forward to account for its existence. Thus some writers of the old-fashioned school (like Mr. C. W. Dale) seek to find a direct cause in the abundance of the precipitation and the amount of sunshine. They assume that bright colours are the direct products of the sun. How then do they account for the fact of there being such a large proportion of dull-coloured species of butterflies inhabiting the tropics? Take a glance, for instance, at such a work as Mr. Distant's 'Rhopalocera Malayana,' if a collection of exotic forms is not available for inspection. It will be seen that the proportion of dull and sombre coloured species is quite equal, indeed if it does not exceed, the proportions existing in temperate climates (such as that of Europe) in comparison with the number of light coloured forms. Then how do they account for the following fact? If we compare two species belonging to corresponding groups, one of which is found in Europe or Japan, and the other in India, we shall generally find that the Indian insect is the smaller and duller coloured of the two.

It is therefore evident that we can dismiss the idea that the colours of butterflies are directly due to the abundance or absence of sunshine. Everything, on the contrary, seems to point to their being the outcome of the organic environment. Other writers (like Mr. Tutt), more in harmony with the natural selection school, maintain that colours with a melanic or melanochroic tendency are useful to their possessors by enabling them to resemble their surroundings, especially when they reside at high altitudes among the mountains, and thus enable them, when at rest, to escape detection by their enemies. When this is the case at the lower elevations I can quite agree with them that the value of these sombre hues is considerable under certain circumstances, but when it exists in the higher zones, where insectivorous birds, mammals, and reptiles are generally so scarce, its purpose is not so easy to comprehend.

Another hypothesis, with especial reference to the genus *Erebia*, has been launched forth by Lord Walsingham, to the effect that their dark colours, by rapidly absorbing the solar rays, give their possessors greater vitality when on the wing than would otherwise be the case. This character, he supposes, would be especially beneficial to the males in searching for the females; in other words, it is of selective value. Now it is well known that rich colours in nature are generally correlative with considerable vitality, and it is thus exceedingly probable that the darker colouring of the males is beneficial to their possessors in the manner indicated; at the same time I do not consider that it constitutes the origin of the particular pigmental colouring of the genus, the primary purpose of which will have to be sought for elsewhere. In support of my contention may be brought forward the fact that there are a large number of light-coloured butterflies also existing at the higher elevations along with the various melanic species of *Erebia*. Some of these are almost exclusively white. A list of these pre-eminently xanthochroic species, which I have encountered in the Alps and the Pyrenees between the altitudes of 5500 and 9000 feet, is as follows:—*Parnassius apollo*, *P. delius*, *P. mnemosyne*, *Aporia cratægi*, *Pieris brassicæ*, *P. rapæ*, *P. napi*, *P. callidice*, *P. daplidice*, *Euchloë belia* var. *simplonia*, *E. cardamines*, *Leucophasia sinapis*, *Colias palæno*, *C. phicomone*, *C. hyale*, *C. edusa*, and *Rhodocera rhamni*. Some of these I have seen in considerable profusion at the elevations of 7000 and 8000 feet. There are also a considerable number of species whose representatives in the higher zones are of a lighter or brighter coloration than the forms existing at the lower elevations.

On the other hand, melanism exists at lower levels as well as at the higher ones, such, for instance, as in *Polyommatus phlæas* var. *eleus*, *Cœnonympha pamphilus* var. *lyllus*, *Melitæa didyma* var. *alpina*, some of them being exclusively found at the lower elevations.

Now respecting ocellation. Dr. A. R. Wallace's theory to account for the predominant character which manifests itself in the Satyridæ, as well as in other groups of butterflies, namely, in the submarginal ocellation of both the upper and the under sides of the wings, is that the eye-like spots are useful for protective purposes. Being situated at a distance from the most vital parts of the insects, he considers that they are the results of natural selection pure and simple. The enemies of the butterflies, principally birds, he presumes, would most likely make for the most conspicuous part of the insect, both when at rest and when flying, and these would in most cases be the ocelli. This being so, it would afford the possessor a chance of escape. In this connection I may here remark that I once captured a specimen of *Colias edusa* which showed unmistakable signs of having been so attacked, and of its consequent escape. Some small bird had probably bitten at the eye-like spot upon the under side of one of the posterior wings while the butterfly was in repose, as a piece had been bitten clean out of both sides from thence to the hind margin. I have frequently seen specimens of the Satyridæ served in a similar manner.

Presuming that Dr. Wallace is correct in his hypothesis, I have endeavoured to prove it by investigating the conditions under which ocellation exists in the Alps and the Pyrenees, where there is plenty of scope for an enquiry of the kind, but the data and material at present collected are inadequate to enable me to make any definite pronouncement either in favour or against his hypothesis. I first of all started with the assumption that ocellation would appear more highly developed upon the wings of those specimens occurring at the lower levels and at the lower latitudes. But in this respect I have at present found the evidence largely of a negative character, which is, however, equally discomforting to those who consider that the abundance of sunshine is the direct cause of the increased ocellation. Thus, while there are some species, such as *Erebia ligea* and *Cœnonympha arcania*—if we consider the forms *euryale* and *satyrion* respectively only alpine varieties—exhibit increased ocellation at the lower altitudes, others, such as *Pararge mœra*, *Erebia stygne*, and *Cœnonympha pamphilus*, do not appear to be similarly affected.

These facts, taken in conjunction with those almost equally as negative respecting the melanistic tendencies of butterflies at high altitudes, evidently belong to the same category of phenomena. The only solution out of the difficulty I can see is that both melanism and ocellation were originally developed at the lower levels for protective purposes, where the organic environment would be more severe, but that they are now retained not because they are any longer required for the same purpose, but by reason that they prove of value in other ways; thus, in the case of ocellation in the genus *Erebia*, for purposes of specific identity and recognition; and, in the case of melanism, as enabling its male possessors to compete more successfully for the members of the other sex, by reason of their enhanced vitality.

Birmingham, Dec. 14th, 1896.

THE PROBABLE CAUSES OF THE DECADENCE OF BRITISH RHOPALOCERA.

By G. Harold Conquest.

With reference to Mr. W. Harcourt-Bath's interesting article on this subject (*ante*, p. 55), I should like to state that it appears to me that Mr. Bath does not lay nearly sufficient stress upon the operations of agriculture as a factor in the extinction in so many localities of the rarer of our British Rhopalocera.

I should say ninety-five per cent. of the extinction has been caused by the operations of our friend the farmer, *i. e.* in the cutting down of our woods and forests, the draining of our fens and marshes, the burning of the furze and indigenous flora of our hillsides, and all the various operations incident to the improvement of the land from a farmer's point of view.

It seems almost puerile to hold collectors, law of amixia, bad seasons, &c., responsible, when one considers the vast changes that agriculture has wrought over the face of a great portion of the British Islands during even the last hundred years, and the enormous destruction of large classes of lepidopterous insects, including of course the Rhopalocera, consequent thereon.

The following examples will, I think, support my contention that it is to the operations of agriculture that the extinction or rarity of many of our British butterflies is chiefly due:—

Papilio machaon.—Formerly abundant in the fen-lands of Cambridgeshire and Huntingdonshire; now, owing entirely to the drainage of the fens for agricultural purposes, confined to the small area of Wicken Fen in Cambridgeshire. *P. machaon* is of course still plentiful in the Norfolk broad district, owing to the fact that its habitat there has not been destroyed for agricultural purposes.

Polyommatus dispar.—Extinct as a British insect, owing to the destruction of its habitat for agricultural purposes.

Apatura iris, Limenitis sibylla.—Formerly in comparative abundance in many localities; now comparatively rare, and occurring in only a few localities, owing to the destruction of woodlands. *A. iris* is often exterminated, although the woods in which it used to occur still exist, owing to the constant cutting away of the undergrowth during winter and early spring, and the consequent destruction of the hybernating larvæ. I could give several instances of this did space allow.

Melitæa athalia, *M. aurinia* (*artemis*).—Now extinct in many localities where formerly abundant, chiefly owing to destruction of woodlands and heaths, and (in the case of *M. aurinia*) draining of marsh and fen-land. *M. athalia* is now, I fear, extinct as an Essex insect; in quite recent times it could be taken in two places at least in this county; both localities have been destroyed for agricultural purposes.

Thecla pruni, *Carterocephalus palæmon* (*paniscus*). — Both species now confined to a few localities (woods) in our midland counties. It is only reasonable to suppose that both these insects must have occurred freely over the counties in which they have been taken, prior to the destruction of the woodlands of these counties. I consider therefore that their present restricted range, and liability to possible extinction as British insects, to be entirely due to the destruction of their habitats for agricultural purposes.

Lycæna arion. — Having personally collected in the chief localities in this country where *L. arion* is or has been taken, I have formed the opinion that agriculture is practically the sole cause of the now comparative rarity of this species; even at Barnwell Wold, where large numbers were undoubtedly taken by collectors, the insect did not become extinct until the fields in which it occurred were burnt by the agriculturist. In the Kingsbridge (South Devon) locality this same burning has been the chief cause of its destruction. *L. arion* still exists on the Cotswold Hills in Gloucestershire, and used to be taken in many other localities in the same county until it was wiped out by agriculture; its continued existence on the Cotswold Hills is due to the fact that the ground on which it occurs has not been broken up for agricultural purposes.

I could cite further examples in support of my views, but those mentioned will, I think, suffice.

Mr. Harcourt-Bath's article refers to British Rhopalocera only, but the evil effects of agriculture (from an entomological point of view) are quite as apparent in the case of many of the Heterocera.

In conclusion, I should wish, in support of my theory, to refer to the simple fact that it is precisely those localities that have been the least affected by agricultural operations that now form our best collecting-grounds; witness the New Forest, practically the last stronghold of many of our woodland Lepidoptera; the broads and fens of Norfolk; the hills and mountains of Scotland and the North of England; and, finally, the cliffs and uncultivated slopes by our sea-shores. The latter frequently form the last resting-place for many species after agriculture has done its best (or worst) to drive them from their native land.

58, Hatherley Road, Walthamstow, March, 1897.

As a practical observer and collector for many years, I should, if asked the cause of the decadence of British Lepidoptera, unhesitatingly say it arose from cultivation and rapacious collectors chiefly. When a student at a well-known Agricultural College on the Cotswolds in the sixties, I was acquainted with one or two isolated and small colonies of *Lycæna arion;* these have long since disappeared owing to farming operations in the form of mowing and feeding. Any one acquainted with agriculture must know how closely sheep tread, feed, and crop the herbage; these must frequently destroy the ova and larvæ of butterflies. As regards collectors, one told me some years since that when *L. arion* was in its glory on the Cotswolds he had taken as many as forty in a morning.

At the present time I do not know where to find it. Should any collector be fortunate enough to discover any new locality, I sincerely hope he will not record it; though slight, it will be an assistance towards preservation. Though late, I believe much might be done if collectors would be content with a small series of a species. Personally, I fail to see the utility of a large one, when there is no variation; and rows crowded together hide the form and outline of an insect, and certainly do not add to the picturesqueness or artistic view of a cabinet.

As regards *Lycæna arion*, I believe it to be also one of those delicate and sensitive creatures which are unable to withstand much interference with their surroundings. Cultivation must in the long run destroy many of our Lepidoptera, but that is no reason why we should assist in the work of extermination by over-collecting.—T. B. Jefferys; 17, New King Street, Bath.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 62.)

Boarmia gemmaria, *Brahm.*—Decidedly local, and not frequently met with; but appears more plentiful in the suburbs of towns than in country districts. Varies widely, as in England, and the var. *perfumaria* occurs with the type at Howth, Clonbrock, and elsewhere. The larvæ are often to be found on ivy in the autumn. Howth, Kingstown, Phœnix Park, and elsewhere near Dublin; Co. Wicklow (*B.*); Cappagh, Co. Waterford, numerous; near Kenmare, Co. Kerry; Mallow, Co. Cork (*Stawell*); Clonbrock (*R. E. D.*), and Kylemore (*Hon. Emily Lawless*), Co. Galway; Markree Castle, Sligo; Tempo Manor (*Langham*) and Enniskillen.

Boarmia cinctaria, *Schiff.*—A local species, probably having a far more general distribution than appears from my list of localities. Most of the great tracts of moor and mountain scrub in Ireland probably harbour this handsome insect; but at the early season of its emergence these wild districts are rarely explored by the entomologist. The females are frequently very small and inconspicuously marked. A larger proportion of the males in Killarney and Glenveagh, Co. Donegal, are strikingly barred with white or pale grey than is met with, I believe, in the New Forest, being generally characterised by darker bands strongly contrasting with a pale ground colour. Again, we find that the very different climate and rainfall of Donegal and Kerry does not appear to have differentiated the pale and dark varietal forms. One example from Colonel Cooper's woods near Markree Castle, Sligo, has all the wings whitish grey traversed only by a brown basal band, and a slightly pencilled, festooned, elbowed line crossing both pairs of wings; with a faint subapical shading on fore wing, and a trace of a submarginal line on the hind wing. The imago being frequently found on birch trunks, it is possible that where these are frequent, natural selection has encouraged the paler forms. There are few handsomer geometers in a cabinet than a good series of variable Irish *B. cinctaria.* Common at Killarney; and Glenveagh, Co. Donegal (*W. E. H.*); and has occurred sparingly at Clonbrock, Co. Galway (*R. E. D.*); Markree Castle, Sligo; and Kells, Co. Meath (*Mrs. Cuppage*).

Tephrosia consonaria, *Hb.*—Stated by Mr. Birchall to be "common in Wicklow and Kerry." At Derrycunihy and Mucross, Killarney, I have taken it in moderate abundance, but the Wicklow habitat must be a strictly limited one. Professor Hart, Mr. M. Fitzgibbon, and myself have collected frequently in spring in various parts of the wooded districts of Wicklow, from Powerscourt to Arklow, but have never met with it. The only other locality I know of is Clonbullogue, King's Co. (*E. S.*).

Tephrosia biundularia, *Bork.*—Some years ago I recorded the capture of *T. crepuscularia*, Hb., from Ireland, but subsequent enquiry, and a more extended acquaintance with the present species, compel me to retract the statement. Representative series of the Irish insect have been sent to Mr. Tutt and other English adherents of the dual theory, and they have all been referred to *T. biundularia*, Bork. For some years, like other collectors who have a one-sided experience, I inclined to ignore the existence of *T. crepuscularia* in its varied forms, but the recent careful discussion of the subject has modified my incredulity. Yet the evidence brought forward by Mr. Tutt, judging from what has been published, appears to me still somewhat incomplete and unsatisfactory. His *résumé* of the controversy, so far as it has yet been printed, is a destructive criticism of various statements put forward by those who would merge the two species; but the actual tabulated facts necessary to prove the "separate and distinct life cycles" require to be more precisely set forth to compel conviction; and when dates are given, the year and locality are not mentioned,—an essential when a range of nearly three months fluctuation is claimed for the date of emergence of both species in differing seasons. It is alleged that a clear four or five weeks elapses "between the first emergence of *T. crepuscularia* and that of *biundularia;* and another three or four weeks between the latter and the second brood of *T. crepuscularia* in any given year." If this has been proved to be the case to the satisfaction of the members of the Entomological Society, before whom the discussion took place, the separation of the two species needs, I think, no further demonstration. But has anyone such a continuous serial collection, labelled with dates, and collected in localities approximate in climatic conditions? That there is but one species in Ireland all the evidence to hand tends to prove, but it is impossible to predicate a distinct negative so long as the fauna remains so ill explored. I have, however, examples from eleven different places, and have sampled specimens from at least as many more, and one important point which bears on the controversy is that in no instance have I met with any *Tephrosia* in Ireland earlier than the end of the first week in April, though the climate of Derry and Down differs from that of Kerry as much as that of Scotland from Devon; nor have I any evidence of the occurrence of a second brood. In June, at Killarney, I have found the insect still plentiful, though mostly worn. If, therefore, *T. bistortata* from Perth emerge in March (a particular which I have not yet seen clearly stated), I should consider the case in favour of two species a very strong one. A comparison of fifty-two Irish specimens with some twenty English *T. crepuscularia* shows that the former are of a clearer ground colour, less powdered with dark scales; with the elbowed line but faintly shaded externally in most cases. Nevertheless, three or four examples taken with the ordinary form in the same locality cannot, I think, be separated from *T. crepuscularia;* and though the average expanse is less, some Irish *biundularia* attain an equal size with it. I cannot accept the dictum that the colour and pattern of the two species furnish alone a sufficient basis for separating the species, because both are very variable, and their variations may become stereotyped into local varieties, as with the melanic form. But this, in conjunction with a different period of emergence, which is the most important matter to place beyond controversy by long series with full data, would decide the question. The moth is abundant in almost every wooded district I have visited in Ireland, both in the north, south, and west. The females appear to be paler generally than the other sex, and the emergence is continuous from toward the end of April to about the first of June. Occasional examples are met with in mid April or earlier in favourable seasons. A smoky form was found on Slieve Donard, above Newcastle, Co. Down, by Mr. Watts, which is heavily charged with dark scales, but is not at all so black as the melanic Yorkshire variety, and is characterised rather by the partial obsolescence of pattern. I have seen nothing similar elsewhere. Some localities in which this moth occurs are as follows:—Powerscourt, Co. Wicklow; Cappagh, Portlaw, and Dromana, Co. Waterford; Glengarriff, Kenmare, and Killarney; near Limerick; Clonbrock and Mount Bellew, Co. Galway; Markree and Rockwood, Sligo; Favour Royal and Altadiawan, Co. Tyrone; Drumreaske, Monaghan; Enniskillen, Newcastle, Co. Down; Farnham, Cavan; Knock Ion and Killynon, Co. Westmeath.

(To be continued.)

LEPIDOPTERA IN 1896.

(Continued from p. 74.)

NOTES FROM RINGWOOD.

The season from March to the end of August here was exceptionally dry and sunny, with a very slight rainfall; the entomologist was consequently on the alert, as many insects were only out for a very limited time, a week's delay in some instances, and captures would be most unsatisfactory. *Emydia cribrum* only lasted for a few days. The season after August was rainy, and rarely fine enough for collecting. Common larvæ upon the oaks were extremely abundant; by quietly standing under the trees, the movements and droppings of the larvæ falling upon the shrubs sounded like a shower of rain; the trees in many cases were almost bare, but the second growth of foliage in June put them in trim again. The following is a partial account of insects taken or bred:—

Jan. 22nd. *Hybernia progemmaria*. 28th. *Vanesa io*. 29th. *G. rhamni*.

Feb. 11th. *Vanessa urticæ*. 12th. *Amphidasys prodromaria* bred. 17th. *Tephrosia crepuscularia*. 26th. Sallows out; also the usual moths upon them. 28th. *Hybernia leucophæaria*, abundant.

March 2nd. *Trachea piniperda*, *Tæniocampa miniosa*, and *Cymatophora ridens*, in numbers; also *Arctia mendica*. 14th. First *Notodonta chaonia*, seven in all bred. 17th. One *Venilia maculata*. 21st. *Gonepteryx rhamni*, very common. 23rd. *Phibalapteryx tersata*, emerging daily, larva found upon clematis. 24th. *Pieris rapæ* out. 25th. Saw two or three

Lycæna argiolus, the earliest I have seen. 26th. Ova of *Liparis monacha* hatching.

April 3rd. *Tephrosia extersaria* caught. 4th. Larvæ of *Callimorpha dominula* and *Chelonia caia*, common about four miles from here. 7th. *Pieris rapæ*, common; *Eupithecia rectangulata*, common. 23rd. *Boarmia cinctaria*, well out; took fifty good specimens; it varies very much in ground colour, and the transverse lines in some cases unite just above the inner margin. It is a curious fact that this species and males of *Hybernia leucophæaria* have similar habits and parallel varieties: put a varied series of each side by side and this will be seen; both drop off from tree-trunks obliquely and simulate death; a novice in either case would think it to be a dead leaf falling; occasionally, of course, both species fly away direct.

May 2nd. *Lycæna argiolus*, abundant; *Platypteryx unguicula* and *Phytometra ænea*, common; *B. cinctaria* very abundant. 5th. *Anthocharis cardamines*, *Satyrus egeria*, and *megæra*, common. 7th. Took forty good *B. cinctaria* and left scores upon the trees; *C. dominula*, *C. caia*, and *Psilura monacha* now pupating. 8th. *Polyommatus phlœas*, *Lithosia aureola*, *Cidaria corylata*, *Larentia berberata*, *Vanessa io*, *V. polychloros*, *Syrichthus alveolus*, *Thecla rubi*, several; *Lycæna argiolus*, still out, but worn. 13th. *Limenitis sibylla*, larvæ common; to-day I took an almost pure white *Boarmia cinctaria* in perfect condition. 14th. *Tæniocampa miniosa*, larvæ extremely common; *Cilix spinula*, *Fidonia piniaria*, *Thera variata*, and *Platypteryx lacertula*, all common; pupa and larva of *Pericallia syringaria*, upon honeysuckle. 15th. *Eurymene dolobraria* out; *Emmelesia alchemillata* and *E. albulata*, very common; *Thanaos tages*, common; *Lithosia rubricollis*, at rest; *Macroglossa bombyliformis* (broad border), common at bluebells; one *M. fuciformis* only. I got about fifty larvæ of *Leucania littoralis* from Mudeford, near Christchurch, from which I have bred out a nice series; also a few *Aspilates citraria*, and later *Zygæna filipendulæ*, from the same place; whilst at Christchurch *Z. trifolii* was abundant. 18th. I was delighted to see *Pieris brassicæ* fairly common, after an absence of several years. 23rd. *Callimorpha dominula*. I bred seven good specimens of the yellow var. *rossica*, Kol. 26th. Larva of *Iodis vernaria* abundant upon clematis in my garden, many full fed. Larvæ of *Thecla betulæ* common; beat above forty to-day; many small ones put back again upon the sloes; *Argynnis euphrosyne* well out. 31st. Two *Acronycta alni* bred.

June 1st. *Lithosia mesomella*, *Scodiona belgiaria*, and *Aspilates strigillaria*, appearing; the heat to-day was unbearable, although in the early morning there was a frost. Last season (1895) *Emydia cribrum* appeared upon June 4th; this year (1896) on the 1st, when I took forty-one, and on the 2nd fifty-two, time to give friends warning: so wrote to two or three, who put in their appearance in due course. The first day we averaged about twenty-five each, but upon comparing notes of course each stated it to be much less; very few collectors like showing their captures, or giving numbers, when a good insect is discussed. Larvæ of *Orgyia fascelina* is generally distributed upon the heaths. 4th. A thunder-storm, with heavy rain, which was most welcome; first rain for months. 5th. *E. cribrum* almost over; saw four only. 13th. *Thecla betulæ* larva very plentiful, full fed; *Argynnis paphia* out; to-day beat over a hundred larvæ of *Cymatophora ridens*, eight *Notodonta chaonia*, and several *Psilura monacha*. 15th. One *Melanippe galiata* upon heath. 20th. *Heliothis dipsacea*, abundant; netted forty-one to-day; also a few *Euthemonia russula*. 24th. *Tephrosia biundularia* out; to-day boxed eight *Boarmia* *roboraria; Iodis vernaria* emerging; I bred out two or three dozens. 29th. *L. littoralis* emerging from pupa.

July 5th. *Limenitis sibylla, Argynnis adippe, A. paphia*, and var. *valesina*, all very common. 11th. Netted a good series of *Acidalia straminata; T. betulæ* emerging freely from pupæ; bred several dozens. Entomology is almost at a standstill; temperature 82° in shade; vegetation parched up. I went over to Brockenhurst, on a visit to my friend Mr. Stokes, in search of "crimsons"; two nights produced thirty *Catocala promissa*, and over sixty *C. sponsa*, both species very abundant. *Orgyia fascelina* emerging. 28th. Saw two or three female *Lycæna argiolus*, second brood, feeding upon bramble bloom; it is curious that I never see any of the spring brood outside the forest, whilst the second one is scattered all around.

Aug. 1st. *Gnophos obscurata* and *Selidosema plumaria*, common. Several *Acherontia atropos* larvæ. I was rather late in looking for this larva, but by the appearance of the potato plants it must have been abundant. 24th. Rainy weather has really set in now; useless to try for insects. 27th. Second brood of *Anaitis plagiata*, common; also a few *Cidaria immanata*. 28th. *Stilbia anomala* making its appearance to-day; I took two males and one female; several later. I take them at dusk; they fly low; also search palings for them. The palings around the forest enclosures are studded with nails half driven in, and bent over, each exhibiting about an inch of its length; in searching for *anomala*, look amongst the nails, as the insect at rest exactly resembles one; wings tightly rolled around its body, pointed crest standing erect, the resemblance is extraordinary, but of course it is really meant to mimic dark irregular pieces of bark upon trees, and in the latter position I have often obtained them.

Anthocharis cardamines has been abundant; the general forest butterflies also; but what (to me) is a mystery is that although the larva of *Thecla betulæ* is always very common, I rarely see the perfect insect. This species usually comes out in August, and its flight is during the morning, about midday; in collecting I must pass many, as the ova are deposited upon the very lowest sloe-bushes. I have seen specimens flying over oak-trees, but have never seen one settle low down.

I was glad to see *Pieris brassicæ* again, as it has been extinct around here for some three or four years, and I think in this case the wasps were the cause, rather than its usual parasites. The last batch of larvæ I saw here was in my garden, upon curly kale. I was about to collect them, when I observed a wasp approach. I kept quiet and watched; it settled upon the plant and made direct for a larva, and with celerity killed it, sucked a quantity of the juicy fluids, and rolled the remainder up with its fore feet and mandibles into a round mass, and so flew away with it. I waited, and within a few minutes the business was repeated; I took the remaining larvæ. Wasps and hornets were very numerous at the time; the larva of *P. brassicæ*, being gregarious and conspicuous, would fall an easy prey. I heard of a specimen of *Leucophasia sinapis* having been seen here, but have not had that pleasure myself, so far, although it used to be common; it is getting scarce in all parts of the Forest.

With the exception of *Vanessa urticæ* the Vanessidæ have been scarce. *V. polychloros* is very erratic in its appearance; some years common, others the reverse. *Thecla rubi* was common, but scattered. *T. quercus*, uncommon. No *Colias edusa*, so expect we shall have to wait for another flight from abroad. *Sarrothripa revayana, Halias prasinana*, and *H. quer-*

cana, fairly common. I found many empty cocoons of the latter under the trees; evidently the pupa had been extracted by tits. *Earias chlorana*, larvæ abundant upon sallow twigs. *Nola cucullatella*, also upon sloe. *N. strigula*, at rest. *Nudaria senex*, common in the meadows. *Calligenia miniata* and *Lithosia mesomella*. One *L. sericea* beaten from yew. *L. rubricollis* upon grass-stems. *Chelonia villica* seems spread about generally. *Arctia fuliginosa* upon heath. I had a larva of *Zeuzera æsculi* feeding inside a holly twig. *Lasiocampa quercifolia* occurs annually in the lanes. Upon a clump of heath I got over 150 small larvæ of *Saturnia carpini;* none were ichneumoned; they mostly pupated; in two cases two larvæ formed a common cocoon, and another formed an oblong cocoon with two perfect exits. Both broods of *Cilix spinula* occurred. *Thyatira derasa* and *T. batis* more plentiful than usual. I took a specimen of *Bryophila glandifera* ten miles inland; it is suffused with greyish green, the markings obscure. Larvæ of *Demas coryli* scarce. Pupæ of *Acronycta ligustri* from ash trees. *Diloba cæruleocephala* very abundant as larvæ, and during the first week in November the imago also; I watched one ovipositing upon an apple tree; it settled upon the under sides of the boughs, and whilst laying kept the wings vibrating. The eggs were placed in groups of three or four, and covered with down; the whole being done with celerity. *Noctua festiva*, *N. dahlii*, *N. brunnea*, and *N. baia* occurred. *Hecatera serena* and *Acronycta aceris*, from tree-trunks. At clematis, the latter part of September, I took five *Triphæna subsequa*, and one *Plusia festucæ*, very pale, but good. *Triphæna interjecta* and *Arctia mendica* I frequently saw flying over hedges in the daytime. I took a very small *T. pronuba*, unicolorous red, quite distinct from the usual varieties. One *Dasycampa rubiginea*, at ivy. Larvæ of *Trachea piniperda* very plentiful. I got one imago of *Tæniocampa munda* off sallow, with broad yellow outer margins. Also boxed one *Agrotis saucia* at ivy; the second taken inland. One *Epunda nigra* bred, Several *Anchocelis lunosa* beaten from firs; also two *Hepialus sylvanus*. *Cosmia affinis*, *Xylophasia rurea*, and var. *alopecurus*. *Leucania turca*, *Grammesia trilinea*, and var. *bilinea*, at sugar. *Cucullia verbasci* is another species which seemed to have disappeared, but the larva was abundant upon both mulleins. *Hadena oleracea* bred minus the red stigmata. *Xylina rhizolitha*, common at ivy. *Charæas graminis*, at light. *Plusia pulchrina* and *iota*, at flowers. Both broods of *P. chrysitis* abundant; blue, green, and bronze, both quite fresh, with perfect ciliæ. *Nonagria fulva*, at ragwort; also one *Agrotis obelisca*. *Anarta myrtilli*, bred two, without the usual white spots. *Plusia gamma* was extremely scarce. *Miana furuncula* swarmed in the fields, and good varieties were obtained.

Geometers, upon the whole, were fairly common. The following is a partial list of captures, &c.:—*Urapteryx sambucata*, abundant. *Epione apiciaria* and *E. advenaria*, uncommon. *Rumia cratægata*, both broods; second small. *Venilia maculata*, amongst bluebells (such a contrast). *Metrocampa margaritata*, *Ellopia fasciaria*, pupæ also beaten from firs; *Eurymene dolobraria*, *Pericallia syringaria*, *Selenia illustraria*, *S. lunaria*, *S. illunaria*, *Crocallis elinguaria*, larva from thorn in spring. *Ennomos erosaria*, pupæ beaten from beech. *Himera pennaria*, several beautiful females bred. *Cleora glabraria*, scarce. *C. lichenaria*, common. *Boarmia repandata* and vars. *B. consortaria* and *B. roboraria*. *Tephrosia consonaria;* *T. crepuscularia*, three broods. *T. biundularia*, uncommon; there is a characteristic difference between the last two species, the transverse lines in the latter being more oblique and better defined, the difference here being marked. *T. extersaria*, pupæ beaten from oaks. *Gnophos obscurata*, abundant, and dark; I get them by searching cart-tracks; the ruts along the sides are a capital resting-place. *Pseudoterpna cytisaria*, larva common upon a pretty dwarf furze. *Nemoria viridata*, common. *Iodis lactearia*, always plentiful, but the green quickly fades. *Ephyra punctaria* and *E. trilinearia*, common. I netted a good series of *Acidalia straminata;* also *A. subsericeata, A. imitaria, A. emarginata, Timandra amataria, Corycia temerata*, and *C. bimaculata;* I have found pupæ of the latter in mid-winter. *Aleucis pictaria; Macaria liturata*, both broods common. *Halia wavaria; Strenia clathrata*, singly. *Scodonia belgiaria, Selidosema plumaria, Aspilates strigillaria*, all common. Black-banded vars. of *Abraxas grossulariata* bred; larvæ extremely abundant upon sloe. I can never get them from currant trees in my garden, whilst wild plants in the meadows produce plenty; formerly I got them from trees against walls; evidently they dislike open places. *Ligdia adustata* and *Lomaspilis marginata*, fairly common. *Pachycnemia hippocastanaria*, extremely abundant upon heath; at dusk they simply swarmed for miles Several nice vars. of *Oporabia dilutata* bred. *Larentia didymata*, abundant. *Emmelesia affinitata* and *E. alchemillata*, in lanes. *E. albulata*, extremely common and variable. *E. decolorata*, scarce. *Lobophora sexalisata, L. viretata* (one only). Larva of *L. carpinata* upon sallows. *Thera variata*, and in company with the second brood I got two or three dozen good *T. firmata. Hypsipetes ruberata* and *H. impluviata. Melanthia ocellata*, both broods. *M. albicillata*, scarcer than usual. *Melanippe unangulata. M. rivata*, some very light, others nearly black. I took one *M. galiata* upon heath. *Anticlea berberata*, a few. *Phibalapteryx tersata*, common. *P. vitalbata*, one only *Scotosia dubitata*. and *S. certata. S. undulata*, scarce. *Cidaria psittacata*, at ivy. *C. miata*, bred. *C. corylata*, common. *C. immanata, C. suffumata, C. testata*, from heaths. *C. fulvata* and larva, from rose-trees. *C. dotata* and *C. associata. Eubolia cervinata*, larvæ abundant. *E. limitata. Anaitis plagiata*, two broods; second small. *Tanagra atrata*, common. *Botys hyalinalis*, several. *Pyralis farinalis*, by hedges. *Herminia tarsipennalis, H. barbalis*, and *Zanclognatha grisealis. Endotricha flammealis*, common. *Hypena rostralis. Aventia flexula*, two. *Cledeobia angustalis*, common. *Pempelia palumbella*, abundant; often mistaken for *E. cribrum*.

Two or three days in early August, at Swanage, produced:—A few *Arge galatea. Hesperia actæon* was very scarce; I did not take any. *H. thaumas*, common under the Castle Hotel. I saw one or two *Lycæna minima*, and I heard of a specimen of *Hesperia paniscus* having been taken there. *Melanippe galiata*, three. *M. procellata*, common. Two good *Sesia musciformis. Gnophos obscurata*, very abundant and varied; many very dark brownish grey, some approaching var. *calceata*. To obtain this species turn up flat stones; this mode is very successful; also put a stick in any hole amongst the rocks, and move it about; *G. obscurata* will fly out in numbers; but one has to be quick in netting them; they bolt with the rapidity of a rabbit. *Zygæna filipendulæ* was about the only common insect seen. Swanage is not much use for collecting after Bank Holiday; upon that day boys in numbers net and catch everything almost. On one occasion I saw one of these boys with a cyanide bottle nearly full of butterflies, many *actæon* amongst them; he of course had not even a collecting-box. I tried to give him a lesson, and to point out the waste, but it was useless. There were more than a dozen others doing likewise. *Actæon* cannot hold out many years longer; it has got very scarce at Lulworth Cove already.—J. Hy. Fowler; Ringwood, Dec. 8th, 1896.

Notes from South Devon.

Though I have not found the past season a profitable one about here, yet a few notes may, I hope, be of interest. I returned to Devonshire in the latter part of March, and found insects swarming at the sallows. Perhaps the best nights were March 23rd, 24th, and 25th. On the 23rd *Tæniocampa cruda*, *T. stabilis*, *T. gothica*, *T. miniosa*, *T. gracilis*, *T. munda*, *Xylina petrificata*, *Cerastis vaccinii*, together with one *Agrotis segetum*, male, in fair condition (I was not aware that this species hybernated, though *A. suffusa* seems to do so, as I have taken it at the flowers of *Daphne mezereon*). On the 24th, a warm and thundery night with intermittent moonlight, moths fell from the sallows in countless numbers, a score or more being in the umbrella at the same time, the only good insect, however, being *Oporina croceago* (two). On the 25th I took an odd couple, viz. *H. progemmaria* male and *T. cruda* female. I failed, however, to obtain ova. On the 31st sloe-blossom proved almost as attractive as the sallows, which were getting over. Several Eupitheciæ were about, chiefly, I think, forms of *E. abbreviata*.

April 5th seems rather early for *Lycæna argiolus*, of which two females were seen (but no males till the 19th). Having to leave home on the 24th, I determined to make an effort to obtain larvæ of *Petasia cassinea*. Accordingly, my father and I went out on the 22nd with beating umbrella, but found the oak-coppice, which covers several hundred acres about a mile from my home, still brown and bare. So we tried our luck in searching young birches for larvæ of *Asphalia flavicornis*, with little success, however; but the first bush we searched (only about six feet high) yielded four larvæ of *Geometra papilionaria*, already, like the birches, in their green attire. On the low branches of another small birch I came across five young larvæ of *Trichiura cratægi*. On a little twig of the same I found four ova (hatched), which I suppose were of this species; they were bolster-shaped, and laid side by side transversely on the twig. *Gonepteryx rhamni* was flying freely, both male and female. We noticed one of the latter laying. The ova are placed singly on end on *Rhamnus frangula* (*R. catharticus* does not occur here). *Pieris rapæ*, *P. napi*, *Vanessa io*, *Lycæna argiolus*, *Anthocharis cardamines*, and *Pararge egeria* were also observed on the wing.

Turning our steps homewards, we found some young oak just in leaf. Now for the umbrella! In a short time we had beaten five small green larvæ, which I felt pretty sure were *P. cassinea*. I have often taken this larva before, but have found it very difficult to rear to the perfect state. Reaching home, I placed them in a nearly empty flower-pot with some twigs of oak, and, fearing that they would escape through the meshes if I covered the pot with net, I used paper instead. One of the larvæ promptly made its escape through a hole in the paper, which I believe it made for itself. The remaining four my father reared, and gave them a large pot of turf in which to pupate. This pot I turned out about the early part of July, and found four large pupæ at a depth of about three or four inches. I did this that I might watch the pupæ, and keep off insect pests. I replaced them at a slight depth, covering them with grass-roots, &c. One died about the middle of October; two moths emerged during November, male and female, but, alas! both cripples. They were kept in a pot with some flowers of

Jasminum nudiflorum, and the female gave me a batch of ova which I hope may prove fertile. The ova are large, round, and flat, and of a brown colour, looking very much like fine specimens of the "mealy bug." The remaining pupa is still lively, and intends, I am afraid, to lie over.

Returning home towards the end of June, I found almost all the early larvæ had disappeared. The drought and heat had hurried them through their larval state. On June 28th I obtained a fine larva of *Amphidasys betularia*, already full-fed.

On July 4th I found a small larva of *Notodonta dictæoides* on a small smooth-leaved birch. For some time it fed well on twigs of birch placed in water. One day, however, I gave it birch of a somewhat woolly texture. It refused to touch it, and kept crawling aimlessly about the pot. It was clearly getting very weak, and could hardly hold on to its food-plant. Suspecting the reason, I supplied it with smooth-leaved birch, and it at once found its appetite again, and I had no more trouble with it. About the middle of the month *Cleora glabraria* was fairly common in a larch plantation, where long tassels of lichen hang from the lower branches. *Boarmia abietaria* was also about at the same place, but difficult to capture, and possessed of a mysterious power of rendering itself invisible as it flitted into the shade.

During the early part of September *Luperina testacea* and its varieties came freely to light, along with a few *L. cespitis*. The latter seldom arrived before 11 p.m., and were all more or less worn. *Heliophobus popularis*, of course, came in swarms (all males; the only way to obtain females seems to be by netting at dusk in grass fields, or by sweeping). On Sept. 9th my brother found a fair specimen of *Acherontia atropos*, only just alive, on the ground outside the house. The insect looked as if it had been crushed, the thorax being nearly in two parts. I have searched many potato fields, but have never come across this moth before.

Ivy, which was well in flower by the end of September, has not been productive. I beat several "pug"-like larvæ from it. Some of these almost answered to Newman's description of *Lobophora viretata*. Others were green all over. They have now pupated. Casually looking over Greene's 'Insect Hunter's Companion,' I noticed he alluded to the attractive powers of sliced rotten apples. I determined to give them a trial. Some I sliced and pressed on, others which were very soft I smeared on the trees. The latter were decidedly the more attractive. I kept to the same trees, going round each night just after six p.m. Often the moths were already thick on the old patch. Usually they dwindled in numbers as night advanced. The following is a list taken from barely a dozen patches:—*Agrotis suffusa*, *A. saucia*, *A. segetum*, *Triphæna pronuba*, *Orthosia lota* (plentiful), *O. macilenta*, *Anchocelis rufina*, *A. pistacina* (in swarms and very variable), *A. lunosa* (*A. litura* is absent from the local list), *C. vaccinii*, *C. spadicea*, *Scopelosoma satellitia*, *Oporina croceago*, *Xanthia silago*, *X. ferruginea*, *Polia flavicincta*, *Epunda nigra* (two males, four females; never before ten p.m.), *Miselia oxyacanthæ*, *Agriopis aprilina*, *Phlogophora meticulosa*, *Hadena protea* (mostly worn, but some beautiful specimens), *Xylina rhizolitha*, *X. petrificata*, *Amphipyra pyramidea*. These were taken from Sept. 29th to Oct. 15th. The weather was very unfavourable, as it was usually either cold and clear, pouring with rain, or blowing half a gale.—F. G. BRIGGS; Fursdon, Egg Buckland, S. Devon, Dec. 17th.

NOTES FROM THE SOUTHEND DISTRICT.

Coleophora albitarsella. Many cases of this insect observed on fences, over ground ivy, early in May.

Phorodesma smaragdaria. Hybernated larvæ not uncommon in May. First moth emerged June 2nd; a female netted at Benfleet, June 22nd. In 1895 I took three moths on June 24th, and bred my first female on June 18th. In 1894 I bred five moths on June 28th. I think, therefore, that the time given for the appearance of the perfect insect in Buckler's 'Larvæ,' vol. vii. p. 61, "about the middle of July," is a little too late. Confirmatory of this is a quotation from Peter Bouchard's diary, in the late Mr. Howard Vaughan's very interesting list of the Lepidoptera of Leigh, which reads: "June 20th, 1857. A fine female *smaragdaria.* I think it ought to be got earlier, near Leigh."

Epichnopteryx reticella. A few cases containing pupæ found in May at Canvey. A large number of males taken by assembling. It is worth a long walk to watch the movements of dozens of this most charming little insect. Very few flew direct to the decoy, but with quavering wings ascended to the top of the fine grass, showing unmistakable excitement.

Dichorampha sequana. At Benfleet, in May.

Lithosia complana. June 9th, one larva found on a lichen-studded post at Canvey.

Hesperia lineola. June 9th, one larva at Canvey. The butterfly was common at the end of the month.

Tortrix viburniana. June 9th, many larvæ in twisted tops of sea-wormwood at Canvey.

Senta maritima var. *bipunctata.* One only, at sugar, Benfleet, June 22nd.

Herminia cribralis. Not uncommon on reeds.

Eupœcilia atricapitana. Among ragwort at Benfleet, early in July.

Melanargia galatea. Several in one field only at Canvey.

Lycæna astrarche. August 3rd, large number observed at Canvey.

Scoparia pallida. On reeds in July at Benfleet.

Eupithecia subnotata. Flying over *Atriplex littoralis* at Benfleet.

Leucania straminea. Larvæ, June 22nd; imagines at sugared reeds in July.

Mamestra abjecta. At sugar in July; only one or two of the var. *variegata.*

Hydrœcia nictitans var. *paludis.* Not uncommon at sugared reeds. Var. *lucens.* One or two at the same time.

Agrotis tritici. One fine large well-marked specimen with broad pale costa.

Chilo phragmitellus. A few only.

Aglossa cuprealis. One specimen only, at rest on a fence.

During the continued wet weather in August and September I collected very few insects, the only captures worth recording being two specimens of *Cirrhœdia xerampelina.* A fine series of *Nonagria lutosa* was taken early in October on reeds at Benfleet, and one or two specimens of *Depressaria yeatiana,* and one *G. stigmatella* about the same time, at sugar.—F. G. WHITTLE; 3, Marine Avenue, Southend, March 1st, 1897.

NOTES FROM READING.

I reported early in the year the capture of a female *Endromis versicolor,* together with a batch of ova deposited on the same branch as that on which I had found the insect. Deeming it best, I devoted my captive, which was of cabinet worth, to ova depositing, and thus ruined a noble specimen in the interests of breeding; and very interesting the breeding proved! *All* the ova were infertile! An attempt to rear a batch of *Boarmia consortaria* larvæ also proved most unsuccessful. They were sleeved on oak, and at first thrived well; yet, in spite of careful attention, dwindled away, and died off in a most discouraging manner. A friend, I am inclined to believe, must have cast an "evil eye" upon them, for no sooner had I told him of my small stock than out came the remark, "They'll all die in a month or so." Among other common things which have fallen to my lot whilst collecting in this neighbourhood have been *Leucophasia sinapis* (Reading finds itself in a proud position indeed, being able to quote an insect of which even the incomparable New Forest is, I believe, now void), *Gonepteryx rhamni*, *Argynnis selene*, *A. adippe*, *Thecla rubi*, *Sphinx ligustri*, *Macroglossa fuciformis*, *M. bombyliformis*, *Lithosia mesomella*, *Nemeophila russula*, *Hepialus hectus*, *Zeuzera pyrina*, *Pœcilocampa populi* (larvæ), *Bombyx rubi*, *B. quercus* (larvæ), *Drepana cultraria*, *Stauropus fagi*, *Lophopteryx camelina*, *Acronycta aceris*, *Hecatera serena*, *Acontia luctuosa*, *Catocala nupta*, *Eugonia alniaria*, *Hemerophila abruptaria*, *Boarmia consortaria*, *Tephrosia crepuscularia*, *Pseudoterpna pruinata*, *Zonosoma orbicularia*, *Panagra petraria*, *Eubolia palumbaria*, &c. An insect I have rarely met with of late is *Orgyia antiqua;* indeed, I do not remember to have seen a single specimen for six or eight years.

A glance back at captures by trap procedure brings the utterance that last year did not equal by a long way its forerunner. To note the falling away both in quality and quantity is at once both easy and disappointing, and the cause is apparently obscure. The nights, taken as a whole, have not been altogether unfavourable, and the trap's position, being precisely that of the bygone year, would not seem to account for the sad falling off. Whether others have this same misfortune to lament, I have not yet lighted upon the means of ascertaining. By the capture and report of one single rarity the trap's reputation is saved, and, by being unprecedented here, adds another important item to last year's list. *Agrotis cinerea* is, I believe, considered a Cotswold insect, yet until now not a single sign of it has been noticed, although both my father and I have worked the district for many years. This and two others, *Trichiura cratægi* and *Eurymene dolobraria*, seem alone to be eligible for the honourable position of "new captures." *Asteroscopus sphinx* always makes a reportable capture, but its appearance is erratic, and only rather above a dozen were taken or seen in November. The following make a somewhat uninteresting list, for which the trap is responsible:—

January has nothing to report of importance.

February.—*Phigalia pedaria* and *Hybernia progemmaria*, with a nice variation.

March.—*Tæniocampa incerta*, *T. stabilis*, *Hybernia defoliaria*, *Anisopteryx æscularia*, and *Anticlea badiata*.

April.—Nights not very favourable, and very few insects made any appearance.

May.—*Spilosoma lubricipeda*, *S. menthastri*, *Cilix glaucata*, *Apamea basilinea*, *Agrotis cinerea*, *Tæniocampa gracilis*, *Hadena thalassina*, *Rumia* *luteolata*, *Selenia lunaria*, *Odontoptera bidentata*, *Himera pennaria*, *Strenia clathrata*, *Melanippe fluctuata*, *Anticlea derivata*, and *Cidaria miata*.

June.—*Spilosoma lubricipeda*, *S. menthastri*, *Cilix glaucata*, *Leucania comma*, *L. pallens*, *L. impura*, *Xylophasia rurea* var. *alopecurus*, *X. lithoxylea*, *X. sublustris*, *X. monoglypha*, *Mamestra basilinea* (not all common), *Grammesia trigrammica*, a fair number of the var. *bilinea*, *Noctua augur*, *N. c-nigrum*. *N. rubi*, *Dianthœcia capsincola*, *Hadena dentina*, *H. dissimilis*, *H. genistæ*, *Habrostola tripartita*, *H. triplasia*, *Plusia chrysitis*, *P. iota*, *Selenia lunaria*, *Odontoptera bidentata*, *Hemithea strigata*, *Acidalia emarginata*, *Timandra amataria*, *Phibalapteryx vitalbata*, *Cidaria pyraliata*, and others commoner.

July.—*Lithosia complanula*, *Bombyx neustria*, *Cilix glaucata*, *Leucania lithargyria*, *L. conigera*, *Cerigo matura*, *Amphipyra tragopogonis*, *Hadena dissimilis*, *Plusia iota*, *Uropteryx sambucaria*, *Pericallia syringaria*, *Selenia bilunaria*, *Crocallis elinguaria*, *Acidalia imitaria*, and *Coremia ferrugata*.

August.—*Trichiura cratægi*, *Neuronia popularis* (more females this year than last), *Luperina testacea*, *L. cespitis*, *Noctua xanthographa*, &c.

September.—*Trichiura cratægi*, *Luperina cespitis*, *Anchocelis pistacina*, *X. lunosa*, *Xanthia gilvago* (a few).

October.—*Cheimatobia brumata*, &c.

November.—*Asteroscopus sphinx*, &c.

December.—*Pœcilocampa populi*, &c.

Those taken by other means in the same neighbourhood include:—*Argynnis euphrosyne*, *A. aglaia*, *Melitæa aurinia* and var. (also a single specimen of this on high ground, near woods, and eight miles away from the big rendezvous), *Melanargia galatea*, *Pararge egeria*, *Epinephele hyperanthes*, *Thecla rubi*, *Lycæna argiolus*, *Nemeobius lucina*, *Sphinx ligustri*, *Chærocampa porcellus* (in abundance), *C. elpenor*, *Smerinthus populi*, *S. tiliæ* (some fine forms), *Macroglossa stellatarum*, *M. bombyliformis* (narrow-bordered), *Ino statices*, *I. geryon*, *Zygæna trifolii*, *Z. loniceræ*, *Callimorpha dominula*, *Nemeophila plantaginis*, *Hepialus lupulinus*, *Drepana cultraria*, *Grammesia trilinea* var. *bilinea*, *Triphæna fimbria*, *Hecatera serena*, *Hadena genistæ*, *Xylina ornithopus*, *Cucullia verbasci*, *C. umbratica*, *Epione advenaria*, *Venilia maculata*, *Amphidasys strataria*, *Tephrosia consonaria*, *T. biundularia*, *Geometra vernaria*, *Zonosoma linearia*, *Z. punctaria*, *Minoa murinata*, *Abraxas sylvata*, *Emmelesia albulata*, *Cidaria suffumata*, *Eucosmia certata*, and *Anaitis plagiata*. *Chærocampa elpenor*, *Callimorpha dominula*, and *Hecatera serena* are all "new takes." Those who have not yet captured the "scarlet-tiger" have an enviable treat in store.—C. J. Nash; Reading.

Sallows in Yorkshire, 1896.

Sallows were very productive in the neighbourhood of York last season, and whilst they were out I visited them on nine different occasions.

My first visit was on March 24th, when, accompanied by my friend Mr. E. G. Potter, we proceeded on bicycles to a wood situated some seven miles from York in a north-easterly direction. At this early date only two trees were in bloom, but moths were obtained in abundance from the first and largest tree. I spread a very large sheet under this tree, and shook the branches vigorously; on examination by the aid of a lantern, the sheet was found thickly peppered with moths. *Tæniocampa munda* was the moth of the evening; it was in great force, and in splendid condition, evidently just out. As the result of the first shake I boxed seventy *T. munda*. A few *T. cruda*, *T. gothica*, *T. stabilis*, *T. instabilis*, *Cerastis vaccinii*, and *Panolis piniperda* were also in evidence.

On March 31st, in company with my friend Mr. B. H. Crabtree, of Manchester, we drove to the wood previously mentioned, and at about 8.30 p.m. commenced to work the sallows. Moths were by no means rare. We obtained *T. munda* (twenty-five males and sixteen females), *T. cruda* (sixteen males and nine females), *T. stabilis* (eighteen males and eight females); one of the female specimens of the last-named species was of a uniform reddish colour similar to the New Forest variety of *T. gracilis*. *T. instabilis* and *T. gothica* were only poorly represented; but of *P. piniperda* we got thirteen males and one female. Other species taken were *Lobophora lobulata* (two males and two females), *Anisopteryx æscularia*, also one example of *Hybernia marginaria* var. *fuscata*. We stayed until 10.45 p.m. Night chilly; wind due north.

On April 2nd I visited the above locality, and commenced operations about 8.30 p.m. Moths scarce. I saw *T. cruda* (six males), *T. stabilis* (four males and one female), and *T. munda* (two males). Night was cold, with wind due north; sky clear and starry.

On April 3rd, in company with my friend Dr. H. Corbett, of Doncaster, I visited some sallows at Wadworth Wood, some three miles from Doncaster. Here we found the sallows nearly over. I got *T. populeti* (four males), *T. instabilis* (one male), *T. stabilis* (three males and one female; one of the males was very pale). Dr. Corbett got about a similar number. The night was cold, and sky clear; wind quite cold, and due north. Mr. Clayton, the woodman, told us that *Brephos parthenias* had been on the wing early in March.

Mr. Potter and I visited the York locality on April 4th. As we were waiting for darkness, we found a nest of the long-eared owl with four eggs. We boxed nine *Lobophora lobulata*, males, in fine condition; these were at rest on birch trunks. Commenced operations at sallows about 8.30 p.m., and by 9.45 p.m. I had selected and boxed over one hundred and fifty moths from amongst a great number of specimens. Nearly one-third of the total were *T. munda;* there were also two *T. populeti*, males, eight *P. piniperda*, males; the remainder were commoner species. Night warm and cloudy; wind south-west. On our return journey, about 10.30 p.m., mounted on our bicycles, we noticed numerous glow-worms, glistening like diamonds, amidst the grass on the roadside; a very early date.

On April 6th Dr. Corbett and self proceeded to the sallows near York, and arrived on the ground about 8.10 p.m., commencing operations about 8.30 p.m. We shook twelve or fourteen fine trees, and had fair success at all of them. We found *T. stabilis* the most abundant moth of the evening, whilst *T. munda* was a good second; *stabilis* was in very fine condition, and varied much in ground colour, from pale ashy grey to light and dark ochreous forms; there were many pairs *in cop.* *T. cruda* was fairly common, and in good condition, and we noticed many pairs of this species, and also of *C. vaccinii.* *S.*

satellitia was by no means rare. Several *L. lobulata* and *H. progemmaria* also fell on to the sheet, as did one *G. libatrix*, the first I have ever noticed at sallows. Several examples of *T. populeti* were boxed, and these were mostly in good condition. *T. gothica* and *T. instabilis* were both common, and in good condition. Neither *satellitia, instabilis, populeti, gothica,* nor *piniperda* were taken *in cop.;* and although I have taken large numbers of the latter at sallows during the last twenty years, I have never yet seen a pair *in cop.* On this occasion we took a male *Selenia illunaria* on the wing. This evening will long be remembered by me as being that on which I took a male *stabilis* paired with a female *munda.* I called Dr. Corbett's attention to the singular occurrence before boxing the specimens. The female laid one hundred and sixty eggs, all of which proved fertile. Dr. Riding, of Honiton, and myself fed these larvæ on ash, oak, sallow, and birch, of all of which they ate freely. As might be expected, the larvæ closely resembled those of *T. munda.* About forty larvæ went down, and we are now anxiously awaiting the emergence of the moths. A specimen of *T. revayana* (a female) was also secured. This is a scarce species in Yorkshire.

In the evening of April 9th, about 7 p.m., I went off alone on my machine to Strensall, arriving there at 8 p.m. Night cold and clear, air rather frosty, and sky quite starlight; there was also a cold breeze blowing from due north. There were not many moths at the sallows, and very few fell into the sheet at each shake. Stayed out until about 9.30 p.m. I took *T. munda* (seven males and ten females), *T. populeti* (two females), *T. stabilis* (two males and four females), *C. vaccinii* (two females), *T. cruda* (three females, one of them a beautiful melanic form, the darkest I have ever seen), *T. gothica* (three females), *T. instabilis* (one female), *L. lobulata* (three males), *A. badiata* (one male). I kept most of the females for eggs. Many of the *T. munda* were worn; the sallows were getting over, some quite *passé*, others well into leaf. Left the wood about 9.50 p.m.

In company with Mr. B. H. Crabtree, I visited the York locality for sallows on April 10th, getting there about 8 p.m. Night cold and windy; wind due north, and quite strong, so strong indeed that it bent the tops of the most exposed sallow bushes, and large branches were swayed about by the breeze. The sallows, too, were about over. We took *P. piniperda* (one female), *T. rubricosa* (one male), *T. munda* (three males and seven females), *T. populeti* (seven males and one female), *T. stabilis* (three males and twelve females), *C. vaccinii* (a pair, *in cop.*, the only pair seen that night), *T. cruda* (four males and twelve females), *T. instabilis* (three males and seven females), *S. illunaria* (one male), *T. gothica* (one male and one female). Noticed a few *L. lobulata* and *H. progemmaria* on sheet. We shook some twelve bushes.

On April 18th sallow-bloom was nearly over; but on this, my last outing for 1896, I obtained, in the wood previously mentioned near York, *P. piniperda* (nine males and nine females in fair condition, some of them good), *T. instabilis* (two males and two females), *T. gothica* (one male and two females), *T. munda* (one female, very worn), *T. rubricosa* (two females in good condition). Saw a few *C. vaccinii*, but no *T. cruda, T. populeti*, or *T. gracilis*. Caught one *S. illunaria*, female, in good condition; this had laid about fifty eggs by the 23rd. I noticed one example of *P. piniperda* flying round and alighting on the blossoms of the sallow about 3 p.m. in the broad sunlight; the sun just then was very hot, and shining full on the tree. Night warm, day very fine; wind south-west.

The commonest insect at sallows last season with me, at York, was *T. munda*, and I was struck by the extreme variation that occurred amongst the specimens taken. I have selected a beautiful series, from the year's captures, of sixteen males and twenty-four females for my own collection. *T. munda* will lay freely in a chip pill-box; the average number of eggs laid by one female about two hundred. The larvæ feed up readily on birch, sallow, elm, or oak; but the pupæ seem to have a strong objection to reveal their contents the following spring, at least such is my experience and that of several of my friends. Whilst on the subject of sallow moths, I might mention that I have noticed for many years how difficult it is to get specimens of *T. rubricosa*, *T. gracilis*, and *T. populeti*, to lay in captivity. Most of the sallows I am in the habit of working are *large* trees, generally situate on the outskirts of *small* plantations. An umbrella, even if of the dimensions of that used by King Coffee, would be far too small. I use two very long and very broad sheets, and then not unfrequently have to add to these two, three, or more copies of one of the London dailies to increase the spread. When all is ready below, I despatch my "Man Friday" up aloft, and then at a given signal he tickles the branches, and down come the moths. Occasionally the shaker is himself dislodged from the tree and drops on the sheet, but this only increases the fun, as it certainly does the danger.—William Hewett; Howard Street, York, November, 1896.

NOTES AND OBSERVATIONS.

High-flat Setting of Lepidoptera.—Although enough has, I think, been said on this subject, I beg to be allowed to say a few more words, in answer to Mr. Sabine's remarks (*ante*, p. 76). If he, as he says, thinks that it is well enough understood and unnecessary to mention, that low-setting is no guarantee against fraud, why then is this mode of setting still carried on? Further, if mites should not be known in a well-kept collection, they are, in spite of it, not an impossibility, even if introduced accidentally with specimens received in exchange; and as to Mr. Sabine's other remark that in no good collection do the insects touch the bottom of the drawer, I can assure him that I have seen very good collections indeed in which every specimen, without exception, *did* touch the bottom, and indeed this could scarcely have been otherwise, considering the small pins used. I am, however, glad to see that I receive some support from several other British entomologists in regard to the high-setting; and on the other hand, I should like to hear yet of the *advantage* of the English system, and why this should be still adhered to in opposition to the entire rest of the world, who surely must have found their system to answer, as they all have adopted it. One more word. I fail to see why the peculiar setting in England should only be confined to the Lepidoptera: why do not collectors of other groups of British insects, or even ornithologists, adopt each a peculiar way of mounting their specimens to distinguish them from continental ones? say, for example, the bird collector might have all his birds stuffed with their beaks open or one eye shut, or the coleopterist might mount his beetles with the two hind legs raised in the air, &c., just to distinguish them from foreign specimens. But, joking aside, let everybody follow his own inclinations and taste in that respect; to me, personally, a collection of Lepidoptera with drooping wings looks, to say the least, untidy and poorly set.—M. Jacoby.

Agrotis ashworthii reared from Ova.—Having occasion to visit the Penmaenmawr locality for this beautiful insect, about the second week in July, I spent an hour looking over the most likely grounds. I only found one perfect insect, but saw several batches of ova. However, having learned from my experience of the previous season that there is a greater chance of success with a moderate number, I only took one batch. These hatched on July 18th, and numbered seventy-one. I tried to force them, feeding on sallow so long as it lasted. They made very slow progress, though kept in flower-pots on the kitchen mantelpiece. About thirty of the larvæ fed up before the others, and I had the satisfaction of knowing that twenty-four or twenty-five had gone down by the middle of October. The remainder, about thirty, absolutely refused to feed up, and gradually died off, being then only about half grown. On November 17th the first imago made its appearance, and between that date and Dec. 18th I had the pleasure of seeing twenty-five perfect specimens emerge. They vary slightly, some being very dark, others very pale, with intermediate forms. After the sallows were over I used knotgrass, groundsel, dock, plantain, and at the very last, lettuce. This latter food they ate freely, but it was rather too juicy for some of them, and they succumbed in the usual way. In my opinion the most successful method would be to procure ova as early as possible, and force slightly, so as to feed the larvæ up by the end of September at latest.—Robert Tait, Jun., 15, Rectory Road, Crumpsall.

Dragonflies of North London.—Apropos of the very interesting article on dragonflies in 1896, by Mr. W. J. Lucas (*ante*, pp. 29–36), a few remarks on the dragonflies of North London may possibly not be unacceptable; and though they are greatly inferior in number and variety to those recorded by Mr. Lucas as occurring in Surrey, yet I can remember the time, many years since, when they were more numerous than at present, and when it was an every-day sight to observe the natural economy of the Æschnidæ, and of *Libellula depressa* emerging from the pupa, on the rushes in a pond in my father's garden at Southgate. I have never enjoyed the same facilities of observation since, and doubtless several localities have been obliterated, and species have disappeared before the inroads of the universal builder.

Calopteryx.—Many years have elapsed since I last saw this genus in Middlesex, and whether or no it still occurs in North London is more than I can say. But in past days *Calopteryx splendens* certainly was common (and I think *C. virgo* also) on the banks of the New River in the grounds of Amos Grove, Southgate. The course of that portion of the New River has since been diverted, and it no longer flows through my cousin's property. In those days, also, my father used to bring these dragonflies home after taking a walk by the River Lea. I believe one chief cause of my own attention being primarily directed to entomology was noticing the extreme beauty of a specimen of *C. splendens* that an old asthmatic spaniel of ours was holding between its paws.

Æschnidæ.—Anax imperator = formosus. An occasional visitor in North London. A solitary specimen was observed by a lady (then a neighbour of ours) two consecutive summers in St. Cuthbert's Road, which skirts the side of my residence. I did not see it myself; but the description which I received of its size, colour, and unusual appearance left no room for doubt that it was that species.—*Æschna cyanea.* Common in this neighbourhood. Specimens from Cricklewood, Dudden Hill, Kingsbury, Northwood, &c.—*Æ. grandis.* Not very common, and difficult to catch. Cricklewood and Pinner.—*Æ. juncea* and *Æ. mixta.* My impression is that one or other of these species used to frequent a pond many years since in the grounds of Amos Grove, Southgate; but I have not seen either of them lately, and have only a single British specimen of each in my collection.—*Brachytron pratense.* I once saw a solitary example, when the summer was well advanced, of what I am almost certain was this species, in Water Lane, Cricklewood. Under the impression that I had missed my stroke, I incautiously opened my net, when it immediately flew out, much to my dismay. Water Lane, now being rapidly surrounded by buildings on either side, no longer serves as a locality for the entomologist. My three examples of this species are from Basingstoke Canal, Byfleet.

Libellulidæ.—Libellula depressa. Common. Dudden Hill, Kingsbury, Cricklewood, ponds on Northwood Common. Often difficult to secure, from the fact of one of its favourite settling places being full length along a bramble spray.—*Sympetrum striolatum* (= *vulgatum*). Wanstead Park, Essex; Northwood Common; Dudden Hill, Cricklewood. —*Libellula quadrimaculata.* I think I have seen this species in Wanstead Park. I imagine it must also occur in this neighbourhood (*e. g.* Cricklewood, Kingsbury, Hendon, &c.), but I cannot speak positively as to having seen it myself here.

Agrionidæ.—Lestes sponsa. Dudden Hill; Wanstead Park, Essex. —*Pyrrhosoma minium.* Dudden Hill; Wanstead Park, Essex.—*Erythromma najas.* Wanstead Park, Essex. Of the four blue species of Agrionidæ, to wit, *elegans*, *cyathigerum*, *puella*, *pulchellum*, I believe I have all from the stretch of water in Wanstead Park, and that *elegans* and *pulchellum*, if not the remainder, occur at Dudden Hill; but I cannot speak positively as to the distinguishing marks of these species until carefully examined and pronounced on by an expert; as also my series of the same from Argyleshire and the New Forest.

So far as I am aware, in no one locality in the immediate North of London are so many dragonflies to be met with as in Wanstead Park —twelve kinds:—

Æschnidæ.—Æschna cyanea, Æ. grandis.

Libellulidæ. — Libellula depressa, L. quadrimaculata, Sympetrum vulgatum.

Agrionidæ.—Agrion pulchellum, A. puella, A. elegans, A. cyathigerum (probably all these number of individuals most abundant on flags and water-lily leaves), *Lestes sponsa, Erythromma najas, Pyrrhosoma minium. Erythromma najas* is very pugnacious, and chases away any other dragonfly that settles on the same water-lily leaf as itself.—(Rev.) F. A. Walker; Dun Mallard, Cricklewood.

Parasites of Bombyx rubi, &c. (*ante*, p. 69).—Mr. Arkle has sent me specimens of *Apanteles difficilis*, Nees. Doubtless the parasite of *Arctia caia* was the closely allied *Apanteles caiæ*, Bouché. Mr. Arkle has also kindly sent me one of the cocoons of the heather-feeding sawfly, which I hope to breed. I find no sawfly with this food-plant in Cameron, André, Brischke, or Kaltenbach; the cocoon greatly resembles that of one of the Ophionidæ, being almost exactly like that of *Ophion luteum* or *Paniscus cephalotes.*—Edward A. Fitch; Maldon.

The Diamond Jubilee.—It has been suggested to us that the lepidopterists of the British Islands should commemorate Her Majesty's long reign by forming a thoroughly representative collection of the butterflies and moths found in the United Kingdom, and presenting the same to the Natural History Museum at South Kensington. Possibly such a scheme may be considered too large an affair to undertake; there is no reason, however, why an attempt should not be made to extend and improve the existing collection of British Lepidoptera in the Museum, which is certainly not as complete as it should be. If a committee were formed to work out the initial details, there is no doubt that any appeals for assistance in the shape of specimens would be liberally responded to. We shall be very pleased to have the views of our readers upon this subject.

CAPTURES AND FIELD REPORTS.

Acherontia atropos at Tenbury.—I was the recipient of a very fine pupa of *A. atropos*, sent me on Feb. 18th, by a lady residing in Tenbury. From her letter I understand that the perfect insect paid her beehives several visits in July and August, and in October three pupæ were unearthed in her garden. I have since followed the instructions for forcing given by Mr. G. F. Mathew (Entom. xxix. 328), the results of which I eagerly await.—H. W. Bell-Marley; Ravenscourt Park, London.

Acherontia atropos in Suffolk.—I have not noticed amongst the many records of the capture of this insect in 1896 any from Suffolk, and I might say, though somewhat late, that two were taken in Ipswich; one was in the public park. A friend who showed me the specimen mistook it for a piece of bark on the grass, and was about to give it a sharp blow with his walking-stick, when the motion of the air caused it to move its wings. The larvæ have been found feeding in a potato field in the west end of the town.—CLAUDE A. PYETT; Waterloo Road, Ipswich.

CALLIMORPHA HERA, &C., AT DAWLISH.—Whilst staying at Dawlish for a fortnight, in the middle of August last year, my brother and I were fortunate enough to catch, amongst other things, six specimens of *C. hera*, three with red hind wings, two with orange, and one with yellow. We also saw another example with red hind wings, but failed to secure it. Three out of the seven seen were flying about, and the sun was shining brightly at the time. We also took one *Thecla betulæ* and a worn *Argynnis paphia*. *Pararge egeria* was very common in nearly all the lanes. We did no collecting at night.—C. E. BEDFORD; Murwance, Acton, W., March 1st.

EARLY APPEARANCES.—Throughout the past month (February) the weather, as far as this part of the country is concerned, has been remarkably mild and bright. On three separate occasions *Vespa vulgaris* was observed, and on one especially bright day a fine *V. crabro* (female) was noticed flying around a window, evidently enjoying its winter's flight. A few days later an hybernated *Vanessa urticæ* was observed resting on a gravel-path.—AUGUSTUS D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, March 4th, 1897.

Gonopteryx rhamni.—On Feb. 27th my brother noticed a *G. rhamni* flying in a street here.—C. E. BEDFORD; Acton, March 1st, 1897.

Phigalia pedaria (*pilosaria*).—My first capture of the season was a fine male *P. pilosaria*, which I found at rest on a lamp at Old Colwyn, when passing through on the evening of January 6th.—R. TAIT, JUN.; 15, Rectory Road, Crumpsall, Manchester.

ENTOMOLOGICAL EXPEDITION TO THE HIMALAYAS. — I am leaving England next week upon an entomological expedition to the Eastern Himalayas, and shall be glad if you will permit me to take this opportunity of informing correspondents that the whole of the specimens which I hope to obtain, with the exception of a series which I shall retain for my own collection, have already been disposed of.—W. HARCOURT-BATH; Birmingham, March 4th, 1897.

RECENT LITERATURE.

The Hemiptera-Homoptera (*Cicadina and Psyllina*) *of the British Islands: a Descriptive Account of the Families, Genera, and Species indigenous to Great Britain and Ireland, with Notes as to Localities, Habitats, &c.* By JAMES EDWARDS, F.E.S. Pp. 261. Appendix, Index, and two plain plates. London: L. Reeve & Co. 1896.

THIS is a valuable addition to the series of excellent works on British Entomology published by Messrs. Reeve & Co.

In 1876, when the 'Catalogue of British Hymenoptera,' by Messrs. Douglas and Scott, was produced, the number of species then known to occur in these islands was 268; at the present time our author finds that the number does not exceed 307, and four of these are now described as new. "The least satisfactory feature of this work is, probably, the record of localities; but the meagre nature of this arises from a cause quite beyond the control of the author, to wit, the paucity of collectors of these insects." Now that we have a thoroughly trustworthy work on Hemiptera-Homoptera to aid us in identification, we may reasonably anticipate not only that considerable additions will be made to our knowledge of the distribution, within our limits, of the known species, but that species new to the list may also be detected.

A large-paper edition, with twenty-eight coloured plates, is also published.

The Lepidoptera of the British Islands: a Descriptive Account of the Families, Genera, and Species indigenous to Great Britain and Ireland, their Preparatory Stages, Habits, and Localities. By Charles G. Barrett, F.E.S. Vol. iii., pp. 396. London: L. Reeve & Co. 1896.

This volume treats of the Bombycidæ, commencing with family ten, and a part of the Noctuæ. Altogether thirty-three genera and ninety-nine species are dealt with.

Economic Entomology for the Farmer and Fruit-grower, and for Use as a Text-book in Agricultural Schools and Colleges. By John B. Smith. Pp. 481. Philadelphia: J. B. Lippincott Company. 1896.

Although this liberally illustrated text-book is intended more especially for American students, it contains much that will interest British entomologists.

Proceedings of the Eighth Annual Meeting of the Association of Economic Entomologists. (Bulletin No. 6. New Series. U.S. Department of Agriculture. Division of Entomology.) Washington. 1896.

Bibliography of the More Important Contributions to American Economic Entomology. By Samuel Henshaw. Pt. v. L–Z. Pp. 179. (U.S. Department of Agriculture. Division of Entomology.) Washington. 1896.

OBITUARY.

We hear with regret of the death of Mr. J. B. Hodgkinson, of Ashton-on-Ribble, which took place at about the end of February last. He was an untiring collector, and a frequent contributor of notes on field work, &c., to the entomological magazines from 1856 to a quite recent date. He first obtained *Cidaria reticulata* in 1856, but the identity of the species was not discovered until 1861, and no other examples were found in the Lakes District until 1876. In 1877 he reared this insect from larvæ, and the following year he bred *Penthina postremana*. He was especially successful in his work among the Micro-Lepidoptera, and added several species to our list, some of which were new to science. Mr. Hodgkinson was elected a Fellow of the Entomological Society of London in 1890.

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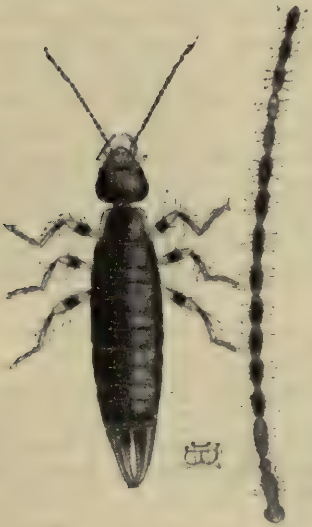
ANISOLABIS ANNULIPES, Lucas.

By W. J. Lucas, B.A.



On April 5th last I received from Mr. G. Nicholson, of Kew Gardens, two living specimens of *Anisolabis annulipes*, an insect having a wide range, but inhabiting somewhat warmer countries than our own. Both specimens were females. They reached England in odd rubbish that was packed around some orchids and other plants that had come to the Gardens from Ootacamund, in the Presidency of Madras. A few days later Mr. Nicholson forwarded me, in spirit, another specimen, a very small one, though apparently of the same species, which had arrived in this country in sugar-cane from Mauritius in August, 1894. Kew, therefore, constitutes the second locality (if locality it may be called) for this earwig in England. The first was at Tavistock, in Devon, where, in 1894, Mr. H. Swale discovered the species in an old baker's shop* in large numbers among the ashes under the furnace. They had their nests in the crevices of the pillars that supported the oven and in the floor. He made out that they were first observed about 1885, and as they were still there last year the colony is evidently well established. As, however, the home of this earwig is in the Mediterranean countries, Africa, Central and South America, Southern Asia, &c., it is hardly likely to permanently take up its abode here, at any rate out of doors.

Anisolabis annulipes is shining black in colour, with a yellowish lateral margin to pronotum. Antennæ of sixteen joints, the three basal ones being reddish, the next eight very dark with lighter apex and base, the next two white, and the last three again dark. Elytra and wings are both absent. The forceps are short and stout, without teeth, but with slightly wrinkled inner margin: in the male the right leg of forceps is more incurved at the point than the left. There are thirteen divisions to the body of the male and eleven to that of the female, the first three forming the thorax, the next nine and seven respectively the abdomen, while the last or anal one bears the forceps. The flattened legs are pale yellow in colour with a dark band round the middle of the femora and another at the base of the tibiæ. Length of male, including forceps, 12 mm.; of female, 15 mm. The specimen figured is a female.

21, Knight's Park, Kingston-on-Thames, April 12th, 1897.

LEUCTINODES VAGANS.

Aphytoceros vagans, Tutt, Ent. Rec. i. p. 203 (1890).
Leuctinodes longipalpis, Warren, Ann. & Mag. Nat. Hist. (6) ix. p. 391 (1892).

ALTHOUGH made known to science through the capture of a specimen at Chepstow, this species of the Pyralidæ cannot be regarded as British. Warren's type of *L. longipalpis*, in the National Collection at South Kensington, is from the Transvaal, and Sir George Hampson, who has seen the Chepstow type and compared it with the African one, is of opinion that both insects are specifically identical.—R. S.

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* Ent. Mo. Mag. 1894, p, 124.

MELANISM AND CLIMATAL CONDITIONS.

By G. W. Smith.

Mr. Harcourt-Bath enters upon this subject (*ante*, p. 97), and contributes some new suggestions as to the origin of melanism in Rhopalocera. He has omitted, however, to take into account the melanic tendencies exhibited by certain British insects inhabiting the environs of our manufacturing towns, and which have been reported to have perceptibly increased during the last fifty years. In the celebrated melanism controversy of 1893, there was only one theory satisfactorily condemned with reference to this particular form of melanism, namely, that of moisture increasing melanic tendencies in insects; such a view being refuted by the presence of light-coloured species, such as *Macrogaster arundinis, Lithosia muscerda*, &c., in especially marshy districts. We may therefore disregard this idea altogether. It was at that time proved by Lord Walsingham that dark-coloured species were benefited in the struggle for existence by being able to take advantage of intermittent gleams of sunshine; and Mr. Robson wrote, "At present we may confidently assert that whatever impedes the direct rays of the sun has a tendency to create melanic forms in Lepidoptera." I think perhaps Mr. Bath has mistaken what he terms the old-fashioned ideas on melanism; for no one has supposed, since Lord Walsingham's theory, that the absence of sunshine has the direct physiological effect of producing dark coloration: it was generally accepted, according to that theory, that melanic varieties of light-coloured species survived through the agency of natural selection by reason of their being able to take advantage of broken, changeable weather.

I may here mention Mr. Birchall's view, which appeared before Lord Walsingham's and resembled the latter in principle: "As it appears certain that greater strength of constitution and more powerful and acute perceptive faculties are, from some yet unknown cause, associated with dark colours in the Vertebrata, may we not presume that insects are subject to the same law, and that dark varieties of Lepidoptera are able to spread and increase under adverse conditions, whilst the lighter coloured types fail to do so, and are consequently eliminated in the struggle for life, and that the occurrence of melanic forms may be thus reasonably explained as a simple case of the survival of the fittest."

Mr. Jenner Weir also, speaking before the London Entomological Society, said: "In the mountains of Switzerland and the Tyrol the clearness of the atmosphere was nearly as great (as in the lowlands of Italy, Spain, &c.), but constantly interrupted by dense mists and clouds, and it is precisely in these altitudes that melanism becomes the rule rather than the exception; many of the topomorphic varieties are melanic, and many of the Alpine species are very dark; *Pieris napi* var. *bryoniæ* may be given as an example of the former, and the males of *Melitæa cynthia* of the latter. This uncertain condition of the weather is characteristic of the climate of the British Isles. The result is that our indigenous Lepidoptera are, as a rule, darker in colour than the continental, and the tendency to melanism increases northwards, till it may be said to culminate in the Shetlands."

I cannot see the force of objections based on the existence of such "zanthochroic" forms as *P. apollo*, *P. delius*, &c., at high levels in the Alps and Pyrenees. One law is not necessarily universal for all species, especially when they belong to different groups.

Mr. Harcourt-Bath has no doubt pointed out a *vera causa* in the preponderance of organic over physical environments, but his theory must not be pushed too far. He cannot disregard physical environment as a factor in the origin of melanism in the light of the increased melanic tendencies in insects inhabiting districts neighbouring on our manufacturing towns, and the views expressed upon this tendency. The melanism controversy of 1893 is conveniently summarized in 'The British Naturalist' for 1893, pp. 61–71.

College, Winchester, April, 1897.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 107.)

Tephrosia punctularia, *Hb.*—Nowhere at all plentiful. Wicklow (Tinahely, *Bw.*) and Kerry (*B.*); Mucross and the Upper Lake of Killarney; Clonbrock, Co. Galway, scarce. Some specimens from this locality have the spots very large on a clear whitish ground, so that they have a superficial resemblance to *Cleora glabraria*.

Gnophos obscuraria, *Hb.*—Widely spread along the Irish coast, and often very abundant; but scarce inland at the few localities it has been reported from, namely Mallow, Co. Cork (*Stawell*); Clonbrock (*R. E. D.*) and Recess, Co. Galway. I have seen no black forms, nor any of the pale chalk varieties. Those at Howth are as light as any Irish examples I have met with. At Minehead, Co. Waterford; Clogher Head, Louth; and Newcastle, Co. Down, they are somewhat darker in tone.

[*Dasydia obfuscaria*, Hb.—Erroneously listed by Birchall as having been taken by Mr. Bristow in Wicklow. A subsequent record in the 'Entomologist' of 1867, p. 251, has not been confirmed by subsequent capture.]

Pseudoterpna pruinata, *Hufn.*—Generally distributed, and abundant.

Geometra papilionaria, *L.*—Throughout Ireland, but usually scarce. Not very uncommon about Killarney, Kenmare, and Glengariff, Co. Kerry; and Mallow, Co. Cork (*Stawell*); New Ross, Wexford (*B. H.*); Clonbrock (*R. E. D.*) and Oughterard (*Halbert*), Co. Galway; Wicklow (*B.*); Killiney (*S.*) and Rathfarnham, Co. Dublin; Castle Bellingham (*Thornhill*); Drumreaske, Co. Monaghan; Farnham, Cavan; Enniskillen (*Partridge*) and Belleisle, Co. Fermanagh; Maghery, L. Neagh (*J.*); Cromlyn (*Mrs. B.*), Westmeath.

Geometra vernaria, *Hb.*—Birchall's Wicklow record must be deleted. One specimen was taken on a wall in Eccles Street, Dublin, by the late well-known entomologist S. R. Fetherstonhaugh, Esq.; perhaps introduced accidentally on an imported plant of *Clematis vitalba.*

Iodis lactearia, *L.*—Common in woods throughout Ireland.

Hemithea strigata, *Müll.*—Scarce. Curiously enough it is usually reported as *Nemoria viridata* by beginners, which insect has not yet been taken in Ireland. Single examples for the most part have occurred as follows:—Ardara, Co. Donegal (*J.*); Knocknarea, near Sligo (*R.*); Ardrahan (*Miss N.*), Moycullen (*Miss R.*), Clonbrock (*R. E. D.*), and near Galway (*A.*); Athlone (*Willcox*) and the Tipperary shore of L. Derg; Farnham, Cavan; Cromlyn (*Mrs. B.*) and Killynon (*Miss R.*), Co. Westmeath; Cappagh, Co. Waterford (*Miss V.*); Ballinadee Rectory (*L.*), Drimoleague (*D.*) and Cork (*S.*); Kenmare, Co. Kerry; Greystones, Co. Wicklow.

Zonosoma punctaria, *L.*—One example taken by Mr. Dillon and one by myself at Clonbrock, Co. Galway.

Zonosoma linearia, *Hb.*—Three at Clonbrock, Co. Galway (*R. E. D.*).

Zonosoma orbicularia, *Hb.*—Occurs sparingly at Clonbrock (*R. E. D.*).

Zonosoma pendularia, *Clerck.*—Local, and sometimes fairly abundant. Irish specimens are unusually richly tinged with rose colour when fresh. Co. Wicklow (*B.*); Cookesborough near Mullingar (*Miss R.*); Clonbrock (*G. V. H.*), Ardrahan, fairly numerous; Co. Galway; also at Favour Royal and Altadiawal, Co. Tyrone; Killarney (*W.*).

Hyria muricata, *Hufn.*—Said by Birchall to be common on the heaths of the south and west. I have never met with a specimen. A few have occurred at Clonbrock, Co. Galway, of the Lancashire type.

Asthena candidata, *Schiff.*—A very local species. Powerscourt, one by Prof. Hart. At Ardrahan and at Merlin Park near Galway it occurs in certain spots not uncommonly.

Asthena sylvata, *Hb.*—Scarce. Powerscourt, one (*G. V. H.*); and it is recorded by Birchall also from Co. Wicklow. In Co. Galway it occurs at Ardrahan, Kilcornan, Merlin Park, Clonbrock (*R. E. D.*), and near Galway (*A.*); Markree Castle, Co. Sligo; and Killarney.

Venusia cambrica, *Curt.*—Powerscourt, Co. Wicklow (*B.*); Howth, a curious variety, with lineolate markings and few spots, taken by Prof. Hart; Favour Royal and Altadiawal, Co. Tyrone; L. Gill (*R.*) and Markree Castle, Co. Sligo; near Derry (*C.*); Newcastle, Co. Down (*W.*); Clonbrock, Co. Galway, one (*R. E. D.*); Westport, Co. Mayo (*W.*); Killarney.

Acidalia dimidiata, *Hufn.*—Often very abundant, and widely spread.

Acidalia bisetata, *Hufn.*—Everywhere common. Var. *fimbriolata* occasionally occurs, and is very often reported as *A. trigeminata*. I believe Birchall's record of the latter has thus crept into the Irish list by mistake.

Acidalia rusticata, *Fb.*—Two or three at Clonbrock, Co. Galway (*R. E. D.*).

Acidalia virgularia, *Hb.*—Mr. Birchall's record of this as common has always been a puzzle to me. One example at Clonbrock, by Mr. Dillon. I have also a statement that it has occurred at Killiney, Co. Dublin, but I have seen no specimens.

Acidalia ornata, *Scop.*—Mr. Dillon reports the capture of a few at Clonbrock, Co. Galway.

Acidalia marginepunctata, *Göze.*—Widely distributed on the coast line, and often numerous. Rarely occurs inland. All the examples I have seen are either of a dingy fuscous grey scarcely spotted, or of a speckled grey, with deeply-shaded marginal bands and large spots. Up to the present I have seen no approach to the light grey Eastbourne forms. The grey limestone coasts of Clare may perhaps produce pale variations. This species sometimes comes to sugar. The second brood does not seem to vary from the first. The following are a few of the localities where it is more or less plentiful:—Howth; Malahide; Bray Head; Arklow; Old Head of Kinsale; Dunmore; Ballycottin Bay; the coast of Kerry generally; Clonbrock, one; Merlin Park near Galway; Kilkeel, Co. Down (*W.*); &c.

Acidalia subsericeata, *Haw.*—I have very little knowledge of the distribution of this species. It is very common at Howth, and at Tramore, Co. Waterford; Clonbrock, one (*R. E. D.*), Co. Galway.

Acidalia immutata, *L.*—Common in many places, and widely distributed. Castle Bellingham (*G. V. H.*); Killynon, Westmeath (*Miss R.*); Toberdaly, King's Co.; Knocknarea, Sligo (*R.*); Moycullen (*Miss R.*), Leenane, Recess, and Clonbrock, Co. Galway; Glengariff and Killarney, common; Minehead and Cappagh, Co. Waterford.

(To be continued.)

ON THE GENUS *GYMNOPLEURUS*, Illiger; WITH A LIST OF SPECIES AND DESCRIPTIONS OF TWO NEW GENERA.

By John W. Shipp.

(Continued from p. 66.)

[ORIENTAL REGION.]

65. *cyaneus*, Fab., Ent. Syst. Suppl. p. 34; Macleay, Horæ Ent. p. 515.
    Tranquebar.
66. *granulatus*, Fab., Ent. Syst. i. p. 65, 1792; Macleay, Horæ Ent. p. 516.
    = *dejeani*, Cast., Hist. Nat. ii. p. 70; Westerman, Dej., Cat. 3 ed. p. 150.
    = *gemmatus*, Har., Col. Hefte viii. p. 117.
    = *kœnigi*, Donovan, Ins. t. 2, f. 3.
    India or.; Pondicherry.
67. *impressus*, Cast., Hist. Nat. ii. p. 73.
    indicus, var., Cast., *l. c.*, p. 73 (note).
    India or.
68. *indicus*, Cast., Hist. Nat. ii. p. 73.
    eximus, Dej., Cat. 3 ed. p. 151.
    India or.
69. *kœnigi*, Fab., Ent. Syst. i. p. 65; Macleay, Horæ Ent. p. 515; Don., Epit. Ins. Ind. 1800.
    = *guttatus*, Lin., Gmel. ed. 1, i. p. 1558 (Mongolia).
    = *scriptus*, Pall., Icon. p. 7, t. a, f. 7 (Tartary).
    India or.; Mongolia.
70. *lacunosus*, Klug., Symb. Phys. v. t. 41, f. 5.
    Arabia.
71. *maculosus*, Macleay, Horæ Ent. i. 2, 1821, p. 517.
    = *bengalensis*, Gory MS.
    = *exanthema*, Wied., Zool. Mag. ii. 1823, p. 22.
    India or.; Bengal.
72. *melanarius*, Har., Col. Hefte i. 1867, p. 76.
    Java; Sumatra.

73. *miliaris*, Fab., Mant. Ins. i. p. 17; Oliv., Ent. i. 3, p. 167, t. 18, f. 164; Ent. Syst. Suppl. p. 817.
India or.
74. *mundus*, Wied., Zool. Mag. i. 3, 1819, p. 162.
= *capicola*, Cast., Hist. Nat. ii. p. 70, 1840.
India or.; China.
75. *opacus*, Redt., Hügel Kaschm. iv. 2, p. 516.
= *wiedemanni*, Dej. MS.
Himalaya Mountains; India or.
76. *parvus*, Macleay, Horæ Ent. p. 517.
India or.
77. *ruficornis*, Mots., Etud. Ent. iii. p. 63.
Shanghai.
78. *sinuatus*, Oliv., Ent. i. 3, p. 160, t. 21, f. 189; Fabr., Syst. El. i. p. 60.
= *leei*, Donovan, Chin. Ins. t. i. f. 4.
China; Java.
79. *smaragdifer*, Walk., Ann. Mag. Nat. Hist. 3rd ser. ii. 1858, p. 208.
Ceylon.
80. *spilotus*, Macleay, Horæ Ent. i. 2, p. 517.
= *scabrosus*, Dej. Cat. 3 ed. p. 150.
India or.; Java.
81. *sumptuosus*, Cast., Hist. Nat. ii. p. 71.
India or.
82. *morosus*, Fairm., Ann. Soc. Ent. Fr. (6) vi. p. 319.
var. of *sinuatus*, Bates, Ent. xxiv. Suppl. p. 73.
Yunnan.
83. *inconspicuus*, Waterh., Ann. Mag. Nat. Hist. (6) v. 1890, p. 371.
E. India; N. W. India (Mhow).
84. *subtilis*, Waterh., Ann. Mag. Nat. Hist. (6) v. 1890, p. 371.
E. India; N. India.
85. *hornei*, Waterh., Ann. Mag. Nat. Hist. (6) vi. 1890, p. 410.
India.
86. *singularis*, Waterh., Ann. Mag. Nat. Hist. (6) vi. 1890, p 410.
Corea.
87. *assamensis*, Waterh., Ann. Mag Nat. Hist (6) vi. 1890, p. 411.
India.
88. *brahminus*, Waterh., Ann. Mag. Nat. Hist. (6) vi. 1890, p. 411.
China.
89. *striatus*, Sharp, Col. Hefte xiii. p. 33, 1875.
Singapore.
90. *æthiops*, Sharp, Col. Hefte xiii. p. 34, 1875.
Rangoon.
91. *planus*, Sharp, Col. Hefte xiii. p. 35.
Penang.
92. *stipes*, Sharp, Col. Hefte xiii. p. 35.
Philippine Islands.

93. *calcar*, Sharp, Col. Hefte xiii. p. 36; Har., Deutsch. Ent. Zeit. 1877, p. 39.
 ♀ = *dubius*, Sharp, Col. Hefte xiii. p. 36.
 Celebes; Menado.

94. *celebicus*, Sharp, Col. Hefte xiii. p. 37.
 Celebes.

95. *rudis*, Sharp, Col. Hefte xiii. p. 37.
 Lombok.

96. *sparsus*, Sharp, Col. Hefte xiii. p. 38.
 Borneo.

97. *productus*, Sharp, Col. Hefte xiii. p. 38.
 Laos.

98. *maurus*, Sharp, Col. Hefte xiii. p. 34; Har., Deutsch. Ent. Zeit. 1877, p. 38.
 Borneo; Sarawak.

99. *abax*, Sharp, Col. Hefte xiii. p. 39.
 Cambodia.

[PALÆARCTIC REGION.]

100. *aciculatus*, Gebler, Bull. Ac. Petr. viii. 1841, p. 372; Bull. Mosc. 1859, p. 465 (329); Reitter, Ver. Nat. Vereines Brunn, xxxi. p. 164 (43), 1892.
 = *violaceus*, Ballion, Bull. Mosc. xliii. 1890, p. 331.
 Lenkoran; Transcaspian Region; Turkestan; Kirgishia.

101 *cantharus*, Erichson, Ins. Nat. iii. p. 757; Reitter, Ver. Nat. Vereines Brunn, xxxi. p. 164 (43).
 var. *cyanescens*, Mots., Bull. Mosc. 1849, iii. p. 101.
 Turkestan; S. Europe; Algeria; Syria; Kleinasien; Caucasus.

102. *flagellatus*, Fabr., Syst. Ent. i. p. 29, 1775; Mant. Ins. i. p. 17 (1787); Fabr., Syst. El. i. p. 59 (1801); Fabr., Ent. Syst. i. p. 66 (1792); Gmel., Linn. Syst. Nat. i. 4, 1555, 226; Oliv., Ent. i. 3, pp. 162, 199, pl. 7, f. 51, *a*, *b*; Oliv., Trad. allem. i. p. 101, pl. 47, f. 10, 11; Macleay, Horæ Ent. ed. Leq. p. 60; Oliv., Encycl. Meth. 5, p. 174; Dumeril, Dict. des Sc. Nat. v. p. 281; Latr., Hist. Nat. x. p. 97; Latr., Gen. des Crust. et Ins. 2, p. 78; Band., Laf. Monogr. p. 46; Suckow, Naturf. p. 212; Fischer, Entom. i. p. 144, pl. 13, f. 4; Illiger, Mag. ii. p. 202; Boit., Man. i. p. 315; Casteln., Hist. Nat. ii. p. 72; Muls., Col. Fr. Lamell. pp. 57, 58; Reitter, Ver. Nat. Vereines, Brunn, xxxi. 1892, p. 164.
 = *coriarius*, Herbst, Kafer. ii. p. 309, t. 20, f. 4.
 = *scabratus*, Fabr., Ent. Syst. iv. app. p. 436.
 = *stictopterus*, Linn., ed. Gmel. i. 4, p. 1558.
 var. *asperatus*, Muls., Col. Fr. Lamell. p. 58; Mots., Bull. Mosc. 1849, iii. p. 103; Stevens, Dej. Cat. 3 ed. p. 150.

var. *clypeolatus*, Muls., Col. Fr. Lamell. p. 58.
var. *conflagratus*, Mots., Bull. Mosc. 1849, iii. p. 102.
var. *confusus*, Muls., Col. Fr. Lamell. p. 58.
var. *cribellatus*, Mots., Bull Mosc. 1849, iii. p. 102.
var. *rugulosus*, Muls., Col. Fr. Lamell. p. 58.
var. *serratus*, Fischer, Lettr. à Pand. 1821, p. 11; Ent. Russ. i. p. 145, t. 13, f. 5.
var. *suturalis*, Mulls., Col. Fr. Lamell. p. 58.
var. *variolosus*, Mots., Bull. Mosc. 1849, iii. p. 102.
Mediterranean Region; France, Basses Alpes; Syria; Caucasus; Transcaspian Region; Turkestan; Siberia; West China; North Africa.

103. *geofroæ*, Fuess., Verz. Schweiz. Ins. 1775, p. 2, 14.
= *geoffroæ*, Sulz., Abgek. Gesch. p. 18, pl. i. f. 7; Panz. Symb. Ent. pl. 5, f. 5, 6, 7, 8; Panz., Ent. Germ. p. 18.
(*geoffroæ*), Rossi, Faun. Etr. i. p. 15; Rossi, ed. Helw. i. p. 16; Ponza, Coleop. Salut. p. 22; Scriba, Journ. i. p. 54, 1790; Brahm., Rhein. Mag. p. 693.
(*geoffroyi*), Sturm., Verz. i. p. 78, pl. 3 (♂); Har. Col. Hefte vii. p. 113.
(*geoffroy*), Duftsch., Faun. Austr. i p. 161 (♂); Fischer, Ent. Russ. i. p. 142, t. 13, f. 3.
= *pilularis*, Fab., Ent. Syst. i. p. 67, 1792; Fab.. Syst. El. i. p. 60; Herbst., Kafer. ii. p. 311, t. 20, f. 5; Sturm., Deutsch. Ins. i. p. 74, 1, t. 4, f. 5; De Vill., C. Lin. Ent. i. p. 22; Schnied., Mag. i, p. 346; Preyssl., Bœmisch. Ins. i. p. 46; Romer, Gen. Ins. pl. 1, f. 7; Macleay, Horæ Ent. ed. Leq. p. 59, ♂; Oliv., Encycl. Meth. v. p. 174; Schäff., Icon. i. pl. 3, 7; Harrer, Besch. p. 34; Dumeril, Dict. des Sc. Nat. v. p. 281; Muls., Lett. i. p. 284; Panz., Schäff. Icon. p. 5; Walcknær, Faun. Par. i. p. 9; Latr., Hist. Nat. xvi. p. 96; Latr., Nouv. Dict. d'Hist. Nat. iii. p. 51; Band., Laf. Monogr. p. 47; Suckow, Naturg. p. 214; Sturm., Deutsch. Ins. Faun. p. 74, p. 11 (♂ det.); Boit., Man. i. p. 314; Casteln., Hist. Nat. ii. p. 70, pl. 4, f. 2, ♂; Muls., Col. Fr. Lamell. pp. 54, 55; Reitter, Ver. Nat. Vereines Brunn, xxxi. 1892, p. 163.
= *mopsus*, Pallas, Icon. 1781, p. 3, t. A, f. 3; Erichs., Ins. Nat. iii. p. 755, 1848.
= *cantharus*, Illiger, Mag. ii. p. 201, 1823.
= *sinuatus*, Fourc., Ent. Paris, i. p. 15.
= *subcyaneus*, Brulle, Exp. Mor. p. ?
var. *atratulus*, Mots., Bull. Mosc. 1849, iii. p. 100.
var. *bidentatus*, Muls., Col. Fr. Lamell. p. 55.
var. *dorsalis*, Muls., *l. c.*

var. *glabriusculus*, Muls., *l. c.*
var. *indistinctus*, Muls., *l. c.*
var. *lævifrons*, Muls., *l. c.*
var. *læviusculus*, Muls., *l. c.*
var. *tuberculatus*, Muls., *l. c.*
var. *obtusus*, Muls. & Rey, Ann. Soc. Ag. Lyons (4), ii. p. 298. (Basses Alps).
Mediterranea Region (Gibraltar, Malta, Sicily, Spain, France, Italy, Greece, Algeria, Morocco, &c.; Austria; Bohemia; S. Germany; Caucasus; Turkestan; Transcaspian Region.

104. *janthinus*, Cast., Hist. Nat. ii. p. 71.
Barbary.

105. *sturmi*, Macleay, Horæ Ent. ii. p. 512; Macleay, Horæ Ent. ed. Leq. p. 59, ♀; Erichs., Nat. Ins. iii. p. 758, 1848.
= *pilularis*, Sturm, Verz. i. p. 79.
= *cantharus*, Dufts., Faun. Austr. i. p. 162.
= *convexiusculus*, Mots., Bull. Mosc. 1849, iii. p. 101.
= *atronitidus*, Macleay, Horæ Ent. ii. p. 513.
Mediterranean Region; Syria; Algeria; Spain; Austria; Siebenbergen.

Gymnopleurus. Habits, &c., noticed—Lucas, Bull. Soc. Ent. Fr. (6) i. pp. lviii, lix.

(To be continued.)

NEW HYMENOPTERA FROM NEW MEXICO, U.S.A.

By T. D. A. Cockerell.

PHILANTHIDÆ.

Cerceris acanthophilus, n. sp.

♂. Length about 8 mm., black, with light yellow markings, closely punctured all over, the punctures very large, so as to produce a subcancellate effect. Pubescence silvery, but very sparse, only conspicuous on lower part of face. The light yellow markings (on face nearly white) are as follows:—All of clypeus, except anterior edge, supraclypeal mark pointed above; lateral face marks occupying all the area between clypeus and eye, and extending upwards, gradually narrowing to an abrupt broad ending on orbital margin, a short distance above level of antennæ; mandibles, except the dark rufous ends; scape, except a dark patch at end above; a broad but interrupted band on prothorax (but not tubercles); tegulæ, except the hind margin; a pair of widely-separated spots on scutellum, postscutellum, distal ends of femora, first four tibiæ entirely, basal three-fifths of hind tibiæ, tarsi (becoming slightly rufous towards ends), two small spots close together on first abdominal segment, and continuous bands on segments 2 to 6. Clypeus slightly convex, the lateral portions separated by a notch, which appears as a small black spot. Base of mandibles overlapped by a brush of hairs. Scape short and stout, somewhat curved; flagellum pale rufous beneath, first joint about one-fifth longer than the second. Tegulæ with a hyaline margin. Wings hyaline, apex strongly fuliginous, nervures and stigma black. First abdominal segment subglobose, a little longer than broad; second very similar to those following. Apex and venter entirely black. The anterior edge of the clypeus is black, and feebly tridentate.

Hab.—Deming, N. M., in numbers flying round a bush of *Zizyphus lycioides*, July 9th, 1896. I cannot identify this with any described species; and Mr. Fox, after comparing it with the collections at Philadelphia, writes, "apparently distinct from any here." It would seem to be near *C. finitima*, Cr., from Illinois; but it differs in colour of stigma, absence of spot behind eyes, and has more yellow on the prothorax. Among the N. M. species it is recognised by the black and yellow legs and abdomen, without any ferruginous, the absence of spots on vertex, the spotted scutellum, the supraclypeal mark, and the first abdominal segment not elongate. Specimens have been sent to Amer. Ent. Soc. and U. S. Natl. Mus.

I have before me other examples of *C. acanthophilus*, with the following data. Four at flowers of *Solidago canadensis*, Las Cruces, N. M., August 24th and 26th. Two on flowers of *Boerhaavia erecta*, Las Cruces, August 23rd. They show remarkable variation in size; the smallest (from *Boerhaavia*), 6 mm.; the largest (from *Solidago*), 9½ mm. The markings are constant, except that the 6 mm. example has a band (instead of two spots) on first abdominal segment.

EUCERCERIS VITTATIFRONS, *Cresson*, var. TRICOLOR, v. nov.

♂. Length, 10 mm. Black, with yellow, cream-colour, and rufous markings. Face pale lemon-yellow, with two black stripes; an oval yellow patch behind upper part of eye; hind margin of prothorax with tubercles, large patch on upper part of pleura, two large pear-shaped transverse patches on scutellum, postscutellum, and large patch on side of metathorax, cream-colour. Tegulæ cream-colour, with a small basal spot and the hind third shining rufo-fulvous. Wings hyaline, marginal cell and apex fuliginous; stigma fuscous. Legs ferruginous, coxæ and first four femora behind blackened; a large patch on first four femora, and stripe on first four tibiæ, shining cream-colour. Abdomen black, with six entire cream-coloured bands, *the first two segments ferruginous.*

Hab.—Las Cruces, N. M., August 5th (C. H. T. Townsend).

PEMPHREDONIDÆ.

SPILOMENA FOXII, n. sp.

♀. Length about 3 mm.; entirely black, except that the scape is orange near the end on one side, the funicle is orange on one side, the knees, tibiæ at ends (front tibiæ almost entirely), and tarsi are orange. Wings hyaline, beautifully iridescent, nervures brown, stigma very large, dark vandyke-brown. Vertex shining, with distinct sparse punctures, ocelli in rather a high triangle, distance between the hind ones not so great as that between one of them and the eye. Mesothorax and scutellum rather dull, with a minute subtessellate sculpture. Abdomen smooth and shining. A compound microscope shows a minute lineolate sculpture on the cheeks, and a sparse extremely short white pubescence on the dorsulum. The lineolate sculpture is also seen on the sides of the face, above the antennæ, accompanied by very sparse punctures; also on the venter of the abdomen, where it runs into a minute tessellation. Flagellum finely pubescent.

Hab.—Santa Fé, N. M., July 5th, in Mr. Boyle's garden, on or about the foliage of an apricot tree (Ckll. 3322). Named after Mr. W. J. Fox, the monographer of the N. Amer. Pemphredonidæ, who first recognised it as distinct. A second species of *Spilomena*, taken at Santa Fé on July 29th, differs at once by the orange antennæ, tegulæ, and entirely orange legs.

MUTILLIDÆ.

Photopsis mesillensis, n. sp.

♂. Length about 7 mm.; head (except black eyes and ocellar region), thorax, and first abdominal segment ferruginous, remainder of abdomen, except the fuscous apex, shining black. All these parts very sparsely clothed with long pale glittering hairs, densest and most conspicuous on the abdomen. Antennæ rufo-testaceous; legs very pale ochreous, the middle and hind femora more or less infuscated. Head small and round, eyes very prominent; mandibles dark at tips, their outer margin with a prominent tubercle or blunt tooth some distance from the base. Vertex with strong very sparse punctures. Antennæ long, first joint of flagellum about two-thirds length of second. Tegulæ testaceous. Mesothorax with strong very sparse punctures; metathorax coarsely reticulate, convex, not abruptly truncate. Middle tibia with two spurs. Wings dull hyaline, minutely hairy, stigma fuscous, nervures almost colourless; two submarginal cells and one recurrent nervure, which joins the second submarginal at about one-third from its base; first submarginal narrow, second large and subtriangular; marginal cell with its poststigmatal portion about as long as stigma, its tip not truncate, though blunt. About two-thirds of stigma included in marginal cell. Petiole joint long and narrow, its suture with the second constricted above. In certain lights the hind margins of the abdominal segments appear narrowly shining testaceous. Apex with two spines.

Hab.—Mesilla, N. M., at light, July 30th, 1896. In colour this resembles *C. nigriventris*, Fox, from Lower California, but that is much larger, and otherwise different.

APIDÆ.

Melissodes menuacha, *Cresson*, var. submenuacha, v. nov.

♂. Length about 13 mm.; antennæ, 9½ mm. Mandibles black, without any yellow spot. Nervures dark.

Hab.—Las Cruces, N. M., at flowers of *Helianthus annuus*, Sept. 22nd (Ckll.); at flowers of *Verbesina encelioides*, College Farm, Sept. 11th (Ckll.); also three others, taken at Las Cruces by Prof. Townsend, Aug. 5th. This resembles *M. aurigenia*, but is a little larger, the clypeus more covered, nervures darker, and the apex of the abdomen is broadly submarginate, sometimes entire.

What I have considered to be typical *menuacha* (always with the yellow spot on mandibles) does not occur in the Mesilla Valley, but is common at Santa Fé (in August, at flowers of *Argemone* and *Grindelia*); and was also taken by me at La Junta, Colo., at flowers of *Lepachys*, and in Fremont Co., Colo. It is almost exactly like *aurigenia*, but uniformly a size larger.

ANDRENIDÆ.

Andrena aliciarum, n. sp.

♀. Length about 10 mm. Black; head, thorax, and legs with short rather dense grey pubescence, feebly tinged with ochreous dorsally. Head ordinary; face about as broad as long, not densely pubescent; clypeus pale lemon-yellow, with the sides black, almost exactly semicircular large cream-coloured lateral marks, filling the area between the clypeus and the eye. Mandibles dark. Basal process of labrum prominent, deeply emarginate, so as to appear as a pair of rounded tubercles. Flagellum brown beneath from the fourth joint to the end, the first joint longer than the two following combined. Sides of vertex with large sparse punctures, irregularly placed. Mesothorax coarsely and very closely punctured; enclosure of metathorax rugulose, bounded by an impressed line. Tegulæ rather dark testaceous, but transparent. Wings yellowish-hyaline, apical margin broadly dusky, nervures fuscous, stigma dull fulvous; second submarginal cell small, higher than long. Pubescence on inner side of basal joint of tarsi blackish fuscous. Abdomen dullish, very closely punctured, the hind margins of the segments broadly testaceous. Apical hair-bands on segments 3 to 5, very dense on 5; second segment with the band represented by lateral patches. The under surface of thorax and abdomen, hind tibiæ, and sides of metathorax, carry a great quantity of bright yellow pollen.

Hab.—Orgara Pass, N. M., on the east side, Sept. 29th, 1896. This resembles *A. aliciæ*, Rob., in having a yellow clypeus in the female, though the yellow is more reduced than in *aliciæ;* the punctures of the abdomen in *aliciæ* are at most very feeble and sparse, quite different from *aliciarum*. It also resembles *A. pulchella*, Rob., but that is larger, and different in several ways. There is, further, some degree of affinity with *A. aureocincta*, Ckll., especially with regard to the abdomen.

Mesilla, N. M., U. S. A., Nov. 26th, 1896.

NOTES AND OBSERVATIONS.

The Probable Cause of the Decadence of British Butterflies.—In the interesting discussion on this subject (*ante*, pp. 55, 102, 104), *Lycæna arion* is referred to as one of the species now on the point of extinction. I have spent several years among the Cotswolds, and my experience leads me to think that *L. arion* is often considered scarcer than it really is. Not that I know of any spot where it is abundant, but it turns up singly or in small batches in various localities. I have spent hours wandering over the spot where it was so abundant twenty-seven years ago; but though *L. icarus*, *L. adonis*, *L. argiolus*, and *L. minima* are all found there, I have not seen *arion* within three miles of its former haunt, nor have I heard of its capture in that locality. Only last year I learnt that several—I think twenty-seven was the number—had been taken, while several others were seen, on a steep hillside, along which I have passed about twenty times in a season without seeing any, so capricious is it in its choice of localities. I know of eight localities where it has been taken in the last five years, but would not set out with any confidence of finding it in any of them in the coming season. Only a small proportion of the captures each year get reported in the magazines, the majority being kept "dark," as the captors are not subscribers to the 'Entomologist,' &c.

Mr. Harcourt-Bath considers the isolation from the Continent as the primary cause in the extinction of species. Isolation is a necessary factor in the production of variations from the type, and Mr. Harcourt-Bath believes in local variation. If there is this variation in the different localities, then there must be isolation and inbreeding, for the introduction of new blood would preserve the type and lessen the amount of variability. If inbreeding is as injurious as Mr. Harcourt-Bath assumes, then those isolated continental local varieties must be dying out too, for many of the mountain forms are more widely separated from their fellows of the same species than are our English forms from those of the Continent.

I cannot agree with Mr. G. H. Conquest "that agriculture is practically the sole cause of the now comparative rarity of *L. arion*," for there are many slopes to all appearances exactly suited to its requirements—abundance of *Thymus serpyllum*, and not over-grazed—where I have searched in vain for both the larvæ and the imago. Burning the herbage may destroy some larvæ, but it cannot exterminate a species like *arion*.

The abundance or scarcity of a species is due to climatal causes, most insects being extremely sensitive, especially in the early larval stages, to changes of heat and cold, drought and moisture, the larvæ perishing very often from no apparent cause. The conditions most favourable to each species are necessary to enable a small percentage to reach maturity, and then these conditions cannot suit each species alike. Similar instances occur in botany, plants being most extraordinarily abundant some years and scarce in the intervening periods, for which we are unable to find a satisfactory solution. Perhaps the instance that most readily occurs to me is the extraordinary abundance of *Ophrys apifera* in 1885 on the Cotswolds, while it has been scarce ever since in those spots where one could not walk without treading on it then, and now considerable search is necessary to discover two or three plants.—Harold J. Burkill; 21, Avenue Victoria, Scarborough.

The Tephrosia Discussion.—It is perhaps fortunate that we have few species of Lepidoptera to perplex us to the same extent that the two insects known as *biundularia* and *crepuscularia* have done. Happily, however, there appears reasonable prospect of our being put in possession of facts of a more satisfactory character than the bulk of those of which we have present knowledge. The microscope is to be brought to bear on structural details of the imago, and we are to have comparative descriptions of the ova, larvæ, &c. Several careful workers are engaged in investigating these important matters; and it is probable that the results of their research will definitely settle the "one or two species" question.—R. S.

On the Irish Tephrosia biundularia.—I have read with the greatest interest Mr. Kane's valuable note on the occurrence in Ireland of the species which he records under the above name (*ante*, p. 105), and should like to offer one or two remarks thereon. In order to avoid possible confusion in the future, it seems necessary to point out that the single-brooded Irish *Tephrosia* with which he deals is *not* the *T. biundularia* of Borkhausen = *abietaria*, Hw. = *laricaria*, Dbld., Sta. Man. (*vide* South's List, p. 12; Briggs, in E. M. M. xxxii. p. 36; and Ent. Rec. viii. p. 76), but is the true *T. crepuscularia* of Hübner, which Doubleday, in his second Catalogue, incorrectly calls *biundularia*, an error in which he is followed by most present-day English writers; hence Mr. Kane's mistake. If our entomologists do not care to follow me in resuscitating Goetze's obsolete name of *bistortata* (1781) for our double-brooded species, Stainton's 'Manual' (ii. p. 28, 29) may quite safely be used as authority:—*T. crepuscularia*, Hb., Sta. Manual = Mr. Kane's Irish species; *T. laricaria*, Dbld., Sta. Manual = *bistortata*, Goetze, which is not yet recorded for Ireland. With regard to the "important matter" of the colour and pattern variation "in conjunction with a different period of emergence," which I understand Mr. Kane to say would settle for him the question of the existence of two species if placed "beyond controversy by long series with full data," plenty of our English collections furnish such; and if no one has adduced particular instances in recent contributions to the controversy, it is probably to avoid repetition of what has already been repeatedly published to that effect (see, for example, Entom. xix. 98, 158, &c.). I suppose the matter will not be allowed to rest until *every* provincial entomologist has seen with his own eyes series of the two insects, arranged with full data, in the way Mr. Kane suggests. It is evidently useless for writers to say that *they* have series so arranged.—Louis B. Prout; 246, Richmond Road, N.E., April 12th, 1897.

Tephrosia biundularia (or T. crepuscularia?).—Now that the time has come round again for the appearance of *Tephrosia biundularia*, the following extracts from my note-books may interest the readers of the 'Entomologist.' Into the controversy as to whether or not *T. crepuscularia* and *T. biundularia* are one and the same species I am not capable of entering, as I have never seen the larva of what is known as *T. crepuscularia*. But I hope to get eggs during the season, and to make a comparison of the larvæ. I have italicised what appear to me to be important features:—

First observed on May 2nd and 5th, 1888. Bred specimens emerged in my breeding-pots from larvæ beaten off birch in Delamere Forest the preceding summer. June 2nd, 1888, took a specimen at rest off an oak trunk in Delamere Forest. April 20th, 1889, took several specimens off oaks. May 24th, 1890, took one; 26th, took a number off oaks as usual, plentiful. June 13th, 1891, took six; from these I obtained eggs—oval, brilliant verdigris-green, no ribs or pattern; deposited in chinks of chip-box, surrounded with white down; hatched June 30th; fed larvæ on sallow. The following is a description of the larvæ:—

July 7th. Dark brown, with black head. Segments two, three, four, and last two or three, plain; the other segments have irregularly blotched white divisions. On the sides of the latter, on each segment, is an irregular trefoil-shaped blotch of the same white. Some of the larvæ are almost black, others are brown, but all have the white markings referred to. They prefer willow or sallow to oak. Proper food-plant birch.

July 12th. Head light brown. Caterpillar much the same as on the 7th, except that it is a lighter brown, and the white ornamentations are more irregular in shape.

August 9th. Colouring very variable; general aspect reddish or hazel-brown. Head small and reddish brown, *slightly notched on the top*. All the segments reddish brown on dorsal area, the three middle segments being always of a darker brown; *third segment has a large well-defined excrescence or enlargement on each side; the twelfth segment is slightly humped on its dorsal surface; this hump is in the form of two notches.* The legs, claspers, and under surface are always of a darker brown (sometimes almost black) than the dorsal surface. From the anal segment of this under surface there is always an indication of a yellowish stripe more or less continued towards the head. There is always a medio-dorsal dark brown stripe, very distinct, from head to anal segment; a subdorsal, well-defined (in most cases), but interrupted, very dark brown stripe, branching to the notches on twelfth segment and then to the anal claspers. Below this is a lateral, *wider*, pale yellowish or whitish stripe marbled with warm russet-brown shades, especially towards the extremities; this stripe contains the dark brown rings or spiracles with yellowish centres; it follows or branches right down the first of the anal claspers, and always appears upon them as a prominent wide double-line ornament of warm russet and pale yellow; it then reappears on the anal segment, and usually terminates in the anal clasper. Below this spiracular stripe the dark hazel under surface begins, after another stripe like the one branching to the notches. Variations are seen in all these shades, stripes, and colours; they are either *very light* (giving the caterpillar the appearance, when extended from or on its anal claspers, of a small light-coloured hazel or birch twig); or *very dark*, when the caterpillar appears to be beautifully marbled with black, various shades of russet-brown, and yellow. In a few cases the prevailing shade of the larva is light grey, the mid-segments being a darker grey, the broad lateral stripe whitish, and the notched twelfth segment smoke-coloured. The caterpillars were now (August 9th, 1891) beginning to pupate in the soil.

On March 22nd, 1892, the first *T. biundularia* emerged; 26th, searched in Delamere Forest for the species, but without result. April 4th, 5th, and 8th, one imago emerged each day; 10th, two emerged; 11th, three emerged, obtained eggs from those which had previously emerged; 12th, one; 18th, one; 21st, six; 23rd, two. May 1st, several; 22nd, eggs from this brood hatched. June 6th, took two specimens at rest in Delamere Forest. 1893, 1894, and 1895, failed to find the species in either of these years. 1896, took one specimen at rest in Delamere Forest, March 28th; another on April 4th; and two on April 18th; Mr. Crabtree, four. Mr. Hargreaves took several during March, some almost black. One of Mr. Crabtree's was very beautifully but yet darkly marked; it resembled the typical *T. crepuscularia*, the only one of the kind, to my knowledge, seen in the Forest. April 25th, took five females and two males off tree trunks. They seem to rest on any sort of tree, palings, &c. June 24th, a larva, bred from eggs laid by the last brood (I lost all the rest through not being able to attend to them one day), went down to pupate. I failed this year (1896) to find any summer brood.—J. Arkle; Chester.

Immigrant Cockroaches. — Though *Periplaneta americana* and *Phyllodromia germanica* are now well established in these islands, it may be interesting to note two instances in which they appear to have been taken in the act of immigrating. On March 1st last, Mr. Bell-Marley sent me two of the former, which, after considerable trouble, he secured on February 20th in Covent Garden, where he does not think they are established; while on April 5th I received from Mr. Nicholson, of Kew Gardens, an immature specimen of the latter (*P. germanica*), which had arrived on the 3rd, from Ootacamund in the Madras Presidency, on living plants.—W. J. Lucas.

High-Flat Setting. — On reading the discussion on high-flat setting, I am reminded that its advocacy is no new thing. It was strongly recommended by two or three ardent reformers in the days of the 'Entomologist's Weekly Intelligencer,' but it then found little favour, and comparatively few converts have been made since; nor do I think that there is the faintest probability of many being forthcoming in the near future. British entomologists certainly do not desire to deter others from collecting insects which are not British, nor is there any wish on their part to force their ideas as to the best methods of setting upon those who prefer other methods; for inconsiderable and unimportant as these islands seem to be in the estimation of some of your correspondents, there is still room in them for more than one idea on more than one subject.

No doubt a common system of setting would have its convenience, as would also a common monetary or fiscal system, or a common language; but we "hardened Britishers" do not feel disposed to "fall into line" with the rest of the "civilised world," upon a point where we consider ourselves far in advance of other people, and where progress in their direction would mean a movement towards the rear.

For, to those who prefer the English style, a well-set specimen is a thing of beauty and a joy for ever; whereas a continental specimen, impaled on a long clumsy skewer, is a painful and distressing object. But of course there are differently constituted minds and varying standards of beauty, and where the uninstructed insular eye sees only ugliness and contortion, the enlightened cosmopolitan may be more happily circumstanced, for possibly

> "Some hidden hand
> Unveils to him the loveliness
> Which others cannot understand."

But I should like to ask for somewhat fuller information, on behalf of those among us who do not confine themselves simply to the Lepidoptera; for on the Continent it is the custom not to set Hymenoptera or Diptera at all, but simply to impale them at the top of long stakes. Are we to adopt the more advanced methods of the civilized world in this respect also, or shall we still be permitted to follow our own savage instincts and endeavour to set our specimens properly?

But consider further, what Mr. Sabine has already so cogently urged—the immense amount of inconvenience and heavy loss the proposed "reformation" would involve to the vast majority, in order to save a small minority a quite inconsiderable amount of trouble. For most British set insects can be easily relaxed and reset in the continental manner, if desired, and collectors of continental specimens would require very few of them; whereas, if the continental method of setting became general here, our cabinets would be rendered useless, and our entire collections would have to be reset, or replaced by fresh specimens; and this would entail so much labour, expense, and loss of time, that most of us would require a new lease of life before we were justified in incurring it. The parrot cry of "insular prejudice," which is so commonly urged against collectors of exclusively British insects, is almost unworthy of notice; for it is obvious that everybody must decide for himself how far he will go, and draw the line somewhere. We "islanders" have no objection whatever to others collecting the insects of the entire universe if they can; but it is expedient for most of us to confine ourselves to a particular part of the earth's surface, and that portion which constitutes our own country appears most convenient to the vast majority.

That collectors who are in a hurry to get together a heterogeneous collection, by indiscriminate exchanging with all sorts and conditions of men, should sometimes be dissatisfied with the result, seems to be quite in accordance with the known laws of Nature. They should confine their exchanging to those whose methods of setting suit them, and not endeavour, vainly, to suppress other people's individuality in order to absorb it into their own.—W. H. HARWOOD; Colchester.

TINEA COCHYLIDELLA, *Stn.*—Mr. Bankes (E. M. M. 2, viii. p. 79) states that he has examined the "unique specimen described by Stainton in Ins. Brit. Lep. Tin. p. 32 (1854) as *Tinea cochylidella*, n. sp.," and is of opinion that it is only "a strongly aberrant specimen of *T. ruricolella*, Stn." He further considers that the last named is quite distinct from *cloacella*, Haw.—R. S.

Butterflies do not always Settle on Flowers of their own colour.—On one of the lovely days last week I was sitting in my garden here, watching the gambols of a trio of small tortoiseshell butterflies, which were enjoying, like myself, the glorious sunshine; rock cress (*Arabis alpina*) and wallflowers were out in profusion, but little else save a few primroses and forget-me-nots. The colours of some of the wallflowers were so balanced as to match, in proportion, the reds, yellows, and blacks of the gay little flutterers; and one would have supposed that their nectar was just as sweet as, and could have been imbibed with greater safety than, that of the *Arabis;* and yet, so far as my observation went, they invariably settled upon the white flower; that is, when they were not frolicking in the air or settled on the ground or grass. Bees, too, though they were not so exclusive in their choice, seemed to prefer the white blossom, upon which they were far more conspicuous than they would have been upon the darker blossoms.—Hy. Knaggs; Folkestone, April 6th, 1897.

Aberrations of British Lepidoptera.—We are pleased to observe that the figures of varieties of Lepidoptera published in the 'Entomologist' are so interesting to our French contemporary 'Le Naturaliste' that they, together with the remarks thereon, have been reproduced in that journal.

Committee for the Protection of Insects in Danger of Extermination.—At the meeting of the Entomological Society of London, held on the 7th inst., the following Memorandum of Association was adopted, and signed by the President, the Council, and many members:—

"We, the undersigned, being desirous of protecting from extermination those rare and local species of insects which are not injurious to agriculture nor to manufactures, do hereby agree by our own example, and by the exercise of our influence over others, to discourage the excessive collecting and destruction of those species of insects which, from their peculiar habits or limited range, are in danger of extermination in the United Kingdom. We further agree to accept, for the purposes of this Association, such list of species in need of protection as shall be drawn up, and from time to time, if necessary, amended, by the Committee of the Entomological Society of London appointed to this end."

A copy of this Memorandum of Association has been forwarded for signature to each of those societies which have expressed themselves as in sympathy with the objects of the Committee. — Chas. G. Barrett, *Hon. Sec.;* 39, Linden Grove, Nunhead, S.E.

CAPTURES AND FIELD REPORTS.

Early Appearance of Lycæna argiolus.—On March 19th the son of Mr. Jeffries, of this town, took a freshly emerged female *M. argiolus;* is not this an unusually early date for this species to be on the wing?—Spotswood Graves; Tenby, March 25th, 1897.

This evening I was surprised to find a perfect male specimen of *Lycæna argiolus* settled on a wall in our garden.—J. F. Bird; Rosedale, 162, Dalling Road, Hammersmith, W., April 13th, 1897.

AGROTIS CINEREA AT READING.—In his notes from Reading (*ante*, p. 117) Mr. Nash stated that the capture of *Agrotis cinerea* at Reading is unprecedented. I beg to say that I captured a specimen here on May 3rd, 1893, and recorded it (Entom. xxvii. p. 71); I also have three specimens captured here last year.—W. E. BUTLER; Hayling House, Reading, April 23rd, 1897.

[Mr. Nash has written to say that "all the trap captures, &c., should have been under the heading 'Notes from Gloucestershire.'"—ED.]

NOTES FROM READING.—*Phygalia pedaria*, taken at light, Jan. 5th. *Hybernia leucophæaria* and *Anisopteryx æscularia* were observed on Feb. 7th, on an old fence. On Feb. 14th *Bombyx rubi* emerged in breeding-cages placed by the kitchen fire. *Hybernia marginaria* occurred at light on Feb. 22nd, and *Nyssia hispidaria* was found on tree-trunks on the 24th of the same month. On March 8th I noticed *Gonopteryx rhamni* flying in my garden. *Endromis versicolor*, the first imago, from ova deposited by a female taken April 6th, 1896 (Entom. xxix. 166), emerged March 10th. Fine male *Tephrosia crepuscularia* were taken on March 20th and 29th, and worn females of the same species on the last mentioned date and on April 4th.—W. E. BUTLER; Hayling House, Reading, April 4th, 1897.

ILLUMINATED MOTH-TRAPS, 1896.—I enclose a list of insects taken in my traps last year and not previously recorded. It was a very good season for light here, and the bulk of the insects contained in my old lists occurred again, the best being *Smerinthus populi* (several), *Nudaria mundana* (extremely common), *Notodonta trepida* (common), *N. trimacula* (common), *Xanthia aurago* (a few; this species was common here last year on sugar), *Asteroscopus sphinx* (over 250 males; no females), *Aventia flexula*, *Eurymene dolobraria*, *Selenia lunaria*, *Boarmia repandata* var. *conversaria*, *Geometra papilionaria* (males only), *Acidalia imitaria* (the last six species all quite common), *Eupithecia coronata* (two), *Lobophora viretata* (first brood common, second fairly so), *Tinea semifulvella* (both broods common). It is, I think, very curious to notice how some insects refuse to come to light. I observed this especially in *D. cultraria*, which was very plentiful in May all round the traps, but not one was taken; while *D. falcataria* and *D. binaria*, both of which were very scarce, were both taken; in fact, *falcataria* was obtained in no other way. The same applies to *Anchocelis rufina*, which was exceedingly common on sugar close to the traps, and was never taken; whereas *A. pistacina*, which was very little, if at all, commoner, was taken frequently. On looking over my old lists, I find I included in one of them *Agrotis corticea*. This was an error, as I subsequently found that the insect was only an extreme form of *A. segetum*. I do not think *A. corticea* occurs here, at any rate I have not come across it.

The following are new to the "light list," viz.:—*Lithosia sororcula* (three), *Arctia caia*, *Spilosoma fuliginosa* (one male), *Trichiura cratægi* (one male), *Bombyx neustria*, *Drepana falcataria* (a few males), *D. binaria* (a few males), *Thyatira batis* (a few males), *Cymatophora duplaris* (one male), *Acronycta alni* (one male), *A. rumicis*, *Leucania comma*, *Hydræcia micacea*, *Mamestra sordida*, *Apamea basilinea*, *Caradrina morpheus* (one male), *Agrotis puta*, *Noctua augur*, *N. baia* (two), *N. castanea* var. *neglecta*, *Calymnia diffinis* (one), *Habrostola triplasia* (one), *Plusia iota*, *Zonosoma pendularia*, *Acidalia dilutaria*, *A. marginepunctata*, *Halia vauaria*, *Emmelesia alchemillata*, *Eupithecia venosata* (a few), *E. fraxinata* (two), *E. albipunctata*, *E. subciliata* (the only one I have known here), *Hypsipetes* *trifasciata* (two), *Melanippe procellata* (one), *M. rivata*, *M. galiata*, *Anticlea rubidata*, *Cidaria prunata* (one), *Chesias rufata* (one), *Scoparia dubitalis*, *S. mercurella*, *S. truncicolella*, *S. augustea* (one in Oct., 1895), *Pterophorus monodactylus*, *Crambus perlellus*, *C. hortuellus*, *Ephestia kühniella* (one, Nov. 10th, 1895), *Rhodophæa consociella* (one), *R advenella* (one), *Oncocera ahenella* (one), *Tortrix corylana*, *Leptogramma scabrana* (one), *Peronea mixtana* (one), *P. schalleriana*, *P. cristana*, *P. ferrugana*, *Teras contaminana*, *Dictyopteryx bergmanniana*, *Penthina corticana*, *P. betulætana*, *Orthotænia striana*, *Phlœodes immundana* (one), *Pædisca occultana*, *Carpocapsa splendidana* (one), *Catoptria scopoliana* (or possibly *cana*), *Eupœcilia maculosana*, *Xanthosetia zoegana* (one), *Argyrolepia badiana*, *Lemnatophila phryganella*, *Talæporia pseudo-bombycella*, *Tinea lapella*, *Swammerdammia combinella* (one), *Hyponomeuta cagnagellus*, *Anesychia decemguttella* (one), *Cerostoma radiatella*, *Harpipteryx xylostella* (one), *Teleia humeralis* (one), *Butalis grandipennis* (one), *Gracilaria alchimiella* (several).—E. F. Studd; Oxton, Exeter, March 17th, 1897.

SOCIETIES.

Entomological Society of London.—*March 3rd*, 1897.—Mr. R. Trimen, F.R.S., President, in the chair. Mr. George W. Bird, of the Manor House, West Wickham, Kent; Mr. Alfred H. Martineau, of Solihull, Warwickshire; Mr. Hubert C. Phillips, M.R.C.S., of 83, Shirland Gardens, W.; Mr. William A. Vice, M.B., of 5, Belvoir Street, Leicester; and Mr. Colbran J. Wainwright, of 147, Hall Road, Handsworth, Birmingham, were elected Fellows of the Society. The Secretary announced that the Committee appointed to consider the question of the protection of British insects in danger of extermination had unanimously resolved that it was desirable to form an Association, the members of which should agree to discourage, by their own example and by their influence, the excessive collecting of all those species of Lepidoptera which from their habits appeared to be in danger of extermination; that this resolution had received the approval of the Council, who would refer the matter back to the Committee, in order that definite proposals for the formation of such an Association might be drafted, and it was hoped to lay these proposals before the Society for discussion upon April 7th. Mr. Champion exhibited, on behalf of Messrs. Godman and Salvin, a portion of the Elateridæ, and the Cebrionidæ and Rhipidoceridæ, recently worked out by him in the 'Biologia Centrali-Americana.' The Elateridæ included 531, the Cebrionidæ 29, and the Rhipidoceridæ 14 species, a large proportion of which were described as new. He stated that his labours had been much facilitated by the free access to the very extensive collection of Elateridæ formed by the late E. W. Janson, and by the loan of many types from Dr. Candèze, who had lent valuable aid. He called attention to the excessive rarity of the males in the Elaterid genera *Chalcolepidius* and *Semiotus* (the contrary being the case in the genus *Scaptolenus* of the Cebrionidæ, and also in many Elateridæ), and to the fact that the sexual characters of *Semiotus* had been misunderstood, the supposed males being really females. In the "fire-flies"

(*Pyrophorus*), a genus containing a large number of extremely closely-allied forms, important specific characters were detected in the genitalia of the males. One species, *Meristhus scobinula*, Cand., was common to Central America and China. He also exhibited a specimen of *Eudectus giraudi*, Redt., found by himself at Mendel, in the Austrian Tyrol, in July last. This is a rare European species of Staphylinidæ, a black variety of which (*E. whitei*, Sharp) had once been found in Scotland, on the summit of Ben-a-Bhuird. Mr. Jacoby showed a Halticid beetle, taken in Mashonaland by Mr. G. A. K. Marshall, and remarkable for a prolongation of the hind tibia beyond the tarsal articulation, into a very long serrated process. Mr. Elwes showed a series of Papilionidæ of the *machaon* group, from North America, including *P. machaon* and *P. oregonia* from British Columbia, *P. brucei*, *P. bairdii*, and *P. zolicaon* from Glenwood Springs, Colorado, and the latter species from British Columbia. He stated that there was a tolerably complete gradation from *P. oregonia* (= *machaon*) through *P. brucei* to *P. zolicaon*, that none of the characters which had been relied on for separation were of real value, and that the structure of the genitalia afforded no assistance. Although *P. bairdii* appeared to be very distinct in appearance and habits, it was associated with the other forms in Colorado, and Mr. W. H. Edwards stated that he had bred both *P. bairdii* and *P. oregonia* from eggs of the same female of either of the two forms. Mr. J. J. Walker mentioned that he had bred *P. zolicaon* from larvæ found on *Sium*, at Esquimault, Vancouver Island, and that neither larva nor pupa was distinguishable from that of *P. machaon*. Mr. O. H. Latter read a paper on "The Prothoracic Gland of *Dicranura vinula*, and other notes," in continuation of his previous communications on the subject. A fresh use of the formic acid secreted by the larva was described; it was employed to alter the silk secreted in spinning the cocoon, in order to convert it into the well-known horny mass. If the acid was prevented from acting, as by supplying the larvæ with bits of blotting-paper soaked in an alkali, to be utilised in making the cocoon, the silk thus protected from the action of the acid retained its usual fibrous structure. Sir George Hampson communicated a paper on "The Classification of two sub-families of Moths of the Family Pyralidæ—the Hydrocampinæ and Scoparianæ."

March 17*th*.—Mr. Roland Trimen, F.R.S., President, in the chair. Mr. Henry Hague, care of the Clydesdale Bank, 30, Lombard Street, E.C., was elected a Fellow of the Society. Mr. Butterfield, present as a visitor, exhibited a series of thirty-three male and six female *Phigalia pedaria*, taken near Bradford, Yorkshire, on Feb. 14th–17th, 1897. Twenty-one males were typical in having a greater or less development of the four transverse bars. The remaining twelve were without bands, and varied in colour from black to smoky olive; they were decidedly less in point of size, ranging from $1\frac{5}{12}$ in. to $1\frac{7}{12}$ in., as against $1\frac{7}{12}$ in. to $1\frac{11}{12}$ in. in the banded forms, and were also poorer in scales and slightly deformed. He had only met with this variety once before in the last twenty years, and suggested that the eruption of small, black, and depauperized forms might have been produced by dryness and want of food in the larval conditions, the trees having been extensively defoliated in the preceding year. Mr. Tutt, in the course of the subsequent discussion, agreed with this view. Mr. Porritt said that the melanic variety had occurred to his knowledge for several years in the Bradford district, and that similar varieties, *e.g.* in *A. betularia*, showed no signs of depauperization. Mr. Kirkaldy exhibited an example of the rare macropterous form of *Velia currens*, Fabr., taken at East Grinstead, and one of *Cicadetta montana*, Scop., from Brockenhurst. Mr. Burr exhibited a series of grasshoppers with red and blue hind wings of the family Œdipodidæ, to show the remarkable variation in colour seen in this group. Red, blue, and yellow forms are found alike in the same species, the blue being due to the failure of the red pigment, and therefore an incipient albinism, the yellow being a further form of albinism. Mr. Champion communicated a paper on the Elateridæ and Rhipidoceridæ collected by Mr. H. H. Smith at St. Vincent, Grenada, and the Grenadines, and exhibited the specimens. Dr. Forel also communicated a paper on the Formicidæ collected by Mr. Smith in the same islands.—W. F. H. Blandford, *Hon. Sec.*

April 7*th*.—Mr. Roland Trimen, F.R.S., President, in the chair. The following Memorandum of an Association for the Protection of Insects in danger of extermination, which had been drawn up by a Committee appointed for the purpose and approved by the Council, was laid before the Society and signed generally by those present:—"We, the undersigned, being desirous of protecting from extermination those rare and local species of Insects which are not injurious to Agriculture nor to Manufactures, do hereby agree, by our own example and by the exercise of our influence over others, to discourage the excessive collection and destruction of those species of Insects which from their peculiar habits are in danger of extermination in the United Kingdom. We further agree to accept for the purposes of this Association such list of species in need of protectlon as shall be drawn up and, if necessary, from time to time amended by the Committee of the Entomological Society of London appointed to that end." The draft of alterations and additions to the Society's Bye-laws, recommended for adoption by the Council, was read for the first time. Mr. McLachlan showed, on behalf of Mr. Gerald Strickland, a magnified photograph of *Brachycerus apterus*, obtained by direct enlargement in the camera, and extremely clear in definition and detail. Mr. Tutt exhibited some of the silk used by *Tephrosia bistorta* to cover its ova, and discovered by Dr. Riding. It was contained in a pouch at the extremity of the abdomen in the form of dense bundles about 2 mm. long, and resembling in miniature locks of wavy flaxen hair. Hitherto all such coverings were supposed to consist of scales from the anal segment. Papers were communicated by Prof. Miall, F.R.S., on "The Structure and Life-history of *Limnobia replicata*," and by Messrs. Godman, F.R.S., and Salvin, F.R.S., on "New Species of Central and South American Rhopalocera."

South London Entomological and Natural History Society.—*February* 25*th*, 1897.—R. Adkin, Esq., F.E.S., President, in the chair. Mr. Bishop, of Kingston-on-Thames, was elected a member. Mr. Billups exhibited, for Mr. Sauzé, some seventy species of Diptera, Coleoptera, Neuroptera, &c., which had been taken during the last year. Mr. Tutt, specimens of *Aglais* (*Vanessa*) *urticæ*, var. *ichnusa*, from Corsica, and remarked that Mr. Merrifield's experiments had resulted only in an approximation to this var. He also showed specimens of *Thais cerisyi*, var. *deyrolii*, from S.E. Europe. Mr. Adkin, two series of *Pachnobia hyperborea* (*alpina*), one from Rannoch and the other from Shetland, and made remarks on its local variation and its unaccountable intermittent appearance. In the discussion which followed, Mr. McArthur gave his experience of its appearance in alternate years. Mr. Tutt suggested that the species still retained its boreal habit of remaining two years in a larval condition. Mr. Adkin instanced *Retinia resinella* as having a precisely similar habit. Mr. Mansbridge, a smoky var. of *Spilosoma lubricipeda* from York. Mr. Tunaley, a large number of species from Aviemore, including long and very varied series of *Erebia æthiops*, *Eupithecia sobrinata*, *Larentia didymata*, *Thera simulata*, *T. firmata*, *Cidaria immanata*, *Emmelesia minorata*, *Pædisca ophthalmicana*, *Gelechia populella*, and others, especially selected to show the range of variation occurring in that locality. Mr. Tunaley read a paper entitled "Notes and Observations in a Holiday in the Black Forest of Scotland from July 29th to Sept. 10th, 1896." In a few words he described the geographical surroundings and the geological formation of the district, together with an account of the weather he experienced and some remarks on the necessary equipment for collecting among the Scotch mountains. He then took the more prominent species, and described the variations, peculiar habits of life, and their protective resemblances. Several of the species were noted as having different times of appearance at different elevations, e. g. *E. æthiops*. He said that *Cloantha solidaginis* at rest on a fir-post closely resembled a piece of curled bark, and pointed out the extensive variation in the central band of *T. juniperata*. The paper was interspersed with apt remarks on Scotch characteristics and terse descriptions of the environment of each species. In the discussion which followed, Mr. Tutt compared the habits of *E. æthiops* in the Alps with those of the species in Scotland, and also contrasted the allied species *E. ligea*, which hid in the fir trees on the disappearance of the sun. Mr. Barrett said that *Epinephele ianira* also roosted in the branches of trees at sunset.

March 11*th*.—The President in the chair. Mr. Lucas exhibited living nymphs of the dragonfly, *Pyrrhosoma minium*, from Oxshott. Mr. Tutt, a pine-branch with a nest of a gregarious europterid moth, sent from Cannes by Dr. Chapman; it was presumably that of *Cnethocampa pityocampa*. He then gave the results of a recent examination of the ova of *Tephrosia crepuscularia* (*bistortata*) and *T. biundularia*, illustrating his remarks with black-board diagrams from drawings made under the microscope that day. There were three distinct batches of ova: (1) of *T. crepuscularia*, (2) of *T. biundularia*, and (3) of the result of a cross between the two species, a female of the former and a male of the latter. The shape and texture of the three batches were well-differentiated; those of *T. biundularia* were smaller, somewhat oval in shape, of a yellow colour, and more opaque; whilst those of *T. crepuscularia* were cylindrical with rounded ends, of a pearly-green slightly transparent and iridescent. The ova which were the result of the cross were intermediate in size, slightly more rounded at one end than the other, and more variable *inter se* than either of the other batches, which were remarkably constant in their characters. He was indebted to Mr. Bacot for the opportunity of examining these batches side by side under the microscope; that gentleman had succeeded in breeding the species at the same time, and had forwarded him the ova on the same day as they were laid. He did not know whether each batch was the product of a single female, or not. Mr. Tutt then referred to the alleged occurrence of *T. biundularia* in Morayshire, and said that the opinion of several members was that Mr. Adkin's specimen was only *T. crepuscularia*. Mr. Horne's specimen from the same district was now exhibited, and he (Mr. Tutt) said that it was identical with the Perthshire specimen, and of the same type as the Central European forms of *T. crepuscularia*. Mr. Montgomery, larvæ of *Mania maura* which he had obtained from Mr. Young, of Rotherham. Mr. Adkin, specimens of *Abraxas grossulariata*, in one of which the yellow band extended across two-thirds of the hind wing, and in the other the yellow colour was reduced in intensity to a very pale buff. He also showed an example of *Arctia caia* with the fore wings much suffused with brown, and with the blue-black blotches of the hind wings much run together. A long discussion took place on the protection of insects in danger of extermination, and finally the following resolution was adopted:—"That the thanks of the South London Entomological and Natural History Society be given to the Committee of the Entomological Society of London for the protection of species of insects in danger of extermination; that the Society strongly approves of the work; and that the members present pledge themselves to use their personal efforts to further the objects of the Committee."

March 25th.—The President in the chair. B. H. Waters, Esq., 48, Finsbury Pavement, E.C., was elected a member. Mr. McArthur exhibited specimens of *Melanippe hastata* from various localities, and said that he had never taken the species in Shetland, nor had he seen the food-plant there. Rev. E. Tarbat, a gynandromorphous specimen of *Melanargia galatea*, taken at Swanage; the markings of the under side followed those of the upper. Mr. Mansbridge exhibited a bred series of *Anchocelis rufina* from Huddersfield, which were less uniformly tinted than the southern examples of this species usually are. Mr. Tutt, specimens of *Phigalia pedaria* (*pilosaria*), taken near Bradford by Mr. Butterfield [*vide* Rep. Ent. Soc. Lond., March 17th, *ante*, p. 147]. Mr. Mansbridge said the black was of a different kind to that of the melanic specimens he had seen from the West Riding. Mr. Tutt reported that Mr. Clarke had taken *Tephrosia crepuscularia* this spring from the wood which Mrs. Bazett had asserted did not produce it, and so confirmed the statement made by Mr. Henderson last October. Rev. E. Tarbat also reported the species from woods near Reading. Mr. Turner, living larvæ of *Cleora lichenaria*, taken in Ashdown Forest, and remarked on their wonderful resemblance to the lichen upon which they fed. He also made a few remarks on the district in anticipation of the proposed visit of the Society at Whitsuntide. Mr. Adkin, series of *Abraxas grossulariata*, bred from Perthshire larvæ, including a noticeable var. with fore wings having a broad white central band with a large circular black discoidal spot, and hind wings also having a large discoidal spot. A paper entitled "Representative Species," by Prof.

A. Radcliffe Grote, A.M., was then read by Mr. Tutt. It dealt at some length with the identical and parallel species which existed in the two continents. The evidence pointed to a continuous land connection between the nearctic and palæarctic regions. Mr. Tutt said he had no doubt that the two faunas had been distributed from the circumpolar region while there existed a subtropical climate there. It was announced that the 'Proceedings' for 1896 were now ready for distribution to members.

April 8th.—The President in the chair. Mr. South exhibited the following Geometridæ from Europe and Eastern Asia:—*Eustroma reticulata* and var. *ærosa*, the latter larger and more golden yellow. *Cidaria silaceata*, Chinese specimens, both larger and smaller than European. *C. corylata*, Eastern examples, very typical. *C. picata*, some Chinese specimens, larger and more yellow than European. *Melanippe procellata*, some were larger than European, and some with ground colour suffused with fuliginous. Mr. Lucas, specimens of an exotic earwig, *Amisolabis annulipes*, which could be distinguished from other British species by two white joints near the tip of the antennæ. The distinctly ringed femora give it its specific name. It was found in 1894 at Tavistock, but the specimens exhibited came from Surrey [figured *ante*, p. 125]. Mr. Adkin, a fine series of red forms of *Tæniocampa gracilis* from the New Forest and Rannoch. Mr. Tutt read a paper entitled "Some Considerations of Natural Genera, and Incidental References to the Nature of Species."—Hy. J. Turner, *Hon. Report Sec.*

Cambridge Entomological and Natural History Society.—*February 12th*, 1897.—Dr. Sharp, President, in the chair. The President showed a remarkable stridulating apparatus in a larva of the coleopterous genus *Passalus*, recently sent by Mr. C. Hose from Borneo. This larva possesses two pairs of largely-developed legs, while each leg of the third pair remains a mere rudiment, but is much altered in form, so as to be like a small paw, with four or five chitinous digits at the extremity wherewith to play on a striated area on the coxa of the leg before it. He remarked that Passalid larvæ are very abundant in logs in the tropics, and that Mr. Champion had informed him that he had heard stridulation proceeding from such logs in Panama. The President also said it was difficult to imagine what use such an elaborate organ could be to larvæ, especially when they led a life of the kind mentioned. He also demonstrated the stridulation of Coleoptera by means of a large individual of the longicorn genus *Batocera*, which produced a rather loud sound when the appropriate movements were made. Mr. Fleet exhibited some Coleoptera, including the blister-beetle and *Apion astragali*, taken at Cambridge some years ago by Mr. Rippon.

February 26th.—*Annual Meeting.*—Dr. Sharp in the chair. Prof. Newton, the Professor of Zoology, was elected an honorary member. Mr. Harmer, of King's College, was elected President for the following year. Dr. Sharp exhibited a larva of one of our common *Geotrupes*, and called attention to its stridulating organ, in which one pair of legs work upon the pair in front of them. He said that this beetle, in the imago state, also possesses a stridulating organ, but it is situated in a different position anatomically, and therefore not corresponding with the larval organ. The latter is lost in the imago, and it is clear that this elaborate structure exists solely for the larval state; but Dr. Sharp acknowledged that he was unable to guess what use such a structure could be to a larva, leading as this does an underground life, and having, as far as we know, no relations with the lives of other individuals of its own species that could be influenced by any sound it might make.

March 12*th*.—The President in the chair. Dr. Sharp exhibited, on behalf of Dr. Haviland, part of his magnificent collection of *Termites*. His method of preparation consists in placing the various forms of a species found in one nest in glass-tubes divided into compartments by cotton-wool and filled with spirit. A photograph of a termitarium of *Termes malayanus*, taken *in situ* after it had been sectionised, showed the royal cell in the middle of the structure, and the chambers for growing fungi—this species being a fungus grower—about the periphery. Portions of this nest and individuals taken from it were exhibited. The nest is composed of thin fragile laminæ of a pottery-like structure; but the royal cell, composed of this substance, is very thick and solid. The fungus-chambers are not constructed of clay, but of comminuted vegetable matter, subsequently cemented together. The specimens taken from this nest included two queens and one king from the royal cell, large and small soldiers, and large-headed and small-headed workers.—L. Doncaster, *Hon. Sec.*

Birmingham Entomological Society.—*February* 15*th*, 1897.—Mr. R. C. Bradley in the chair. Exhibits:—By Mr. Bradley, unusually fine large specimens of *Cimbex sylvarum* from Sutton. By Mr. A. H. Martineau, bramble stems containing pupæ of aculeate Hymenoptera, and explained how he collected them in this manner; also cocci of cochineal as imported; also Vespæ, to show their position during hybernation—they hang by their mandibles, with their legs all drawn up and their wings under the body, the wings to some extent supporting the body. By Mr. G. W. Wynn, varieties of *Cerastes vaccinii* and *C. spadicea*, taken at sugar at Hanbury Park; one of *C. vaccinii* had a pretty chestnut thorax, with chestnut marginal bar and fringes and some at the base of the fore wings, the rest of the fore wings being greyish, giving the appearance of a chestnut insect with greyish bars. By Mr. Fountain, local bred *Nyssia hispidaria*. By Mr. C. J. Wainwright, rare Diptera, including *Orthoneura brevicornis* (a pair from Sutton), *Chrysogaster virescens*, female (from Sutton), and *Chilosia berganetammi*.

March 15*th*.—Mr. G. T. Bethune-Baker, President, in the chair. Exhibits:—By Mr. R. C. Bradley, various Lepidoptera. By Mr. A. H. Martineau, *Odynerus livipes* from Wyre Forest, a rare insect, which he said seemed to be well established at Wyre, as Mr. Bradley had also taken specimens there on another occasion; he also showed *Sphecodes niger*, male. By Mr. Bethune-Baker, two drawers containing a portion of the Papilionidæ, with the genus *Parnassius* and its allied genera; they included *Luehdorfia puziloi* from Vladivostock, *Sericinus telamon* from Eastern Asia, *Ismene helios* from Switzerland, &c., and a fine rich dark variety of *Doritis apollinus* from Asia Minor, with a great deal of red and more black than usual.—C. J. Wainwright, *Hon. Sec.*

Lancashire and Cheshire Entomological Society.—*March 8th.* The President, Mr. S. J. Capper, F.L.S., F.E.S., in the chair. Mr. Fred Birch read a paper entitled "An Excursion to *Cassiope*-land, with a sample of its Entomologial Fauna," in which he graphically described a visit to the grand Langdale Pikes, in Westmorland, in search of this the only alpine species of butterfly occurring in England, which he was successful in capturing, along with *Crambus furcatellus* and other rare mountain species. The Rev. A. M. Moss also read a paper entitled "Notes on *Cidaria reticulata* from Windermere," in which he recounted his experience in taking this species in the larvæ and imago stages. Both papers were well illustrated by numerous specimens. Mr. Moss also exhibited a drawer of Bombyces, with life-histories. Mr. J. G. Mason, a long series of *Tæniocampa opima*, bred a week previously. Mr. John Watson, *Colias hyale* and vars. *poliographus* and *simoda*, *C. erate* var. *sareptensis* and ab. *erioptera*, and *C. romanovi.*—T. N. Pierce, *Hon. Sec.*

The Nonpareil Entomological and Natural History Society.—*December 3rd*, 1896.—Mr. Harpur exhibited a block of solid African ebony in which was a large boring, out of which he had extracted the body of a caterpillar very much like *Cossus ligniperda* in shape and colour, and probably an African representative of that species. Mr. Walmer exhibited insects from the New Forest. Mr. Lusby exhibited a good series of *Ocneria dispar* with a series of *P. bucephala*. Concerning *L. dispar* a curious fact came to light. Last autumn Mr. Gurney gave some eggs of the species (all laid by the same female) to Messrs. Lusby, Craft, and Newbery. The larvæ resulting from these were fed up; Mr. Lusby's on red-flowered hawthorn, and those of Messrs. Craft and Newbery on white-flowered hawthorn. Mr. Lusby could get nothing else to feed his larvæ upon, and the leaves he said were large, old, and tough. The imagos resulting from these were fine large specimens, whilst those of Messrs. Craft and Newbery were small and stunted. Mr. Craft showed a box of bred insects from Nottingham. Mr. Newbery exhibited a series of *Hybernia aurantiaria* and *H. defoliaria*, both sexes, with a variable series of *Cheimatobia brumata*, taken at Wood Street on November 28th.

December 17th.—Messrs. Gurney and Martin exhibited series of *H. aurantiaria* and *H. defoliaria*, taken at Wood Street. It would seem that both species, and also *C. brumata*, were very plentiful, although the specimens were not quite as large as usual. Mr. J. A. Clarke exhibited twelve specimens of *Lycæna ægon;* these included two typical males from Cumberland and two ordinary females from Box Hill. The remainder were female specimens from Cumberland.

March 4th, 1897.—Mr. Huckett exhibited a case containing handsome series of *A. grossulariata*, among which were some very fine dark and suffused forms; also series of *A. prunaria*, *L. salacis*, and *P. syringaria*. Mr. Schooling exhibited series (bred from egg) of *A. remutata*, *M. galiata*, and *M. rivata*. He took *galiata* at Ramsgate, and in gathering bedstraw as food for the larvæ he obtained eggs of *rivata*, which he fed on knot-grass and then dandelion during hybernation. In July he also took *A. aversata*, from which he obtained eggs, reared the subsequent larvæ, and the imagines emerged about August, all females, Mr. Smith exhibited a specimen of the Australian species *Agarista glycinæ*, taken in the Spaniards Lane (Hampstead) at dusk. The opinion was that either it had been accidentally imported into this country in the pupa state, or else had escaped from the cage of someone breeding the insect in that neighbourhood. He also showed male and female specimens of the great water-beetle (*Dytiscus marginalis*). Mr. Harpur, Jun., exhibited *P. pilosaria*, *H. leucophæaria*, and *A. æscularia*, taken last week in Highgate Woods.

March 18*th*.—Mr. Pearce showed *Sesia scoliæformis* and *P. alpina*, both bred from Scottish larvæ, which he stated were obtained in exchange for dark vars. of *H. abruptaria*. Mr. Pickett exhibited very fine foreign insects; preserved larvæ of *A. atropos* and *S. convolvuli*, taken at Folkestone; also larvæ of *M. cinxia*, *M. artemis*, *A. paphia*, *S. fagi*, and *E. jacobææ* (? locality). Mr. Stevens had on view a pretty series of *Dianthœcia*, including *carpophaga*, *capsincola*, and *cucubali*. Mr. Stillwell, three specimens of a beetle imported in a truss of alva from Sweden; these were very like our *Melalontha vulgaris*, of which there was a specimen in the box. Mr. J. A. Clarke exhibited a very fine bred series of *N. hispidaria*, bred from ova deposited by a female taken on an oak near Chingford Hotel. The specimens were remarkably light. Several members promised to read papers at future meetings.

April 1*st*.—The chief feature of this meeting was the series of *Brephos parthenias* taken recently at Epping by several members. Mr. Croft, Jun., exhibited a very light female specimen of *H. ianira*. A very fine and long series of *T. miniosa* (fifty specimens) was shown by Mr. Samson; they were bred this year from seventy larvæ taken near Winchester. Mr. Pickett exhibited a fine series of *E. versicolor*. He said they were bred from pupæ sent by a gentleman in Kent. The curator, in passing the exhibit, remarked that they were probably Tilgate specimens from their size. Mr. Pickett also exhibited preserved larvæ of *O. fascelina*, *A. alni*, *H. rupicapraria*, *C. hera*, *A. paphia*, *B. roboraria*, *S. fagi*, and *B. rubi*. Mr. Lusby exhibited a series of *B. parthenias*, taken at Epping in 1895. On being compared with those captured this year, an inferiority in size was distinctly noticeable. Mr. Stevens exhibited two English *A. cratægi*, with chrysalis case; and also male and female *A. prodromaria*, the male bred, and the female from Richmond Park. He also showed specimens of *A. betularia* from Wimbledon.—F. A. Newbery, *Reporting Secretary*.

RECENT LITERATURE.

Abstract of Proceedings of the South London Entomological and Natural History Society for the year 1896, together with the President's Address. Pp. 132. Published at the Society's Rooms, Hibernia Chambers, London Bridge. March, 1897.

Once again this successful and increasingly popular Society presents us with its annual volume, and we note with satisfaction that the date of publication is an earlier one than it has been for some years past. It is to be hoped that this improvement will be maintained in future. In the President's Address reference is made to the question of "Collector *v.* Entomologist," and certain lines of experimental work suggested to the collector or practical entomologist who may desire to assist in elucidating some of the questions connected with variation, heredity, and the general laws operating in the production of species.

The 'Proceedings' will be found to embrace a good deal of instructive matter, and the papers generally are excellent. Among the latter we would especially direct attention to Mr. Enock's "Life-history of *Cicindela campestris*"; "Further Notes on *Triphæna comes*, Hb. (*orbona*, Fab.)," by Mr. R. Adkin; "Is Cold the Cause of Melanism in Scotch Specimens of *Triphæna orbona*, Hufn. (*comes*, Tr.)?" by Mr. Tutt; "What is the Cause of Melanism in the Scotch Specimens of *Triphæna comes*, Hb. (*orbona*, Fb.)?" by Mr. Adkin; and "Notes on *Acidalia marginepunctata* and *Cyaniris* (*Lycæna*) *argiolus*," also by Mr. Adkin.

The figures of portions of the male antennæ of *Hybernia aurantiaria* and *H. defoliaria*, reproduced from photographs by Mr. F. Clark, are of great interest; and the same remark applies to the drawings of *C. argiolus* depositing ova, and those showing larvæ of the same species resting on flower-buds of ivy.

Report of Observations of Injurious Insects and Common Farm Pests, during the year 1896, with Methods of Prevention and Remedy. Twentieth Report. By Eleanor A. Ormerod. Pp. i–x, 1–160. London: Simpkin, Marshall, Hamilton, Kent, & Co., Limited. 1897.

The importance of Miss Ormerod's annual volume is now so widely acknowledged, and its value so generally understood, that it seems unnecessary to do more than announce publication of the Report for 1896. It may be noted, however, that although "many kinds of agricultural insect infestations were present during the year, no special attack was seriously prevalent over the whole island." Altogether some thirty injurious insects are referred to, and of these eleven belong to the order Lepidoptera, and six to Coleoptera. The article on *Carpocapsa pomonella* (the codlin moth), and that on the two parasitic flies—*Cephenomyia rufibarbis* and *Lipoptera cervi*, are each of considerable interest. In the chapter on *Musca domestica* a great deal of information concerning the life-history of the species is brought together.

Notes on Lepidoptera Collected in the Edinburgh District. By William Evans, F.R.S.E. (Ann. Scott. Nat. Hist., No. 22, pp. 89–110, April, 1897.)

Preliminary List of the Neuroptera and Trichoptera of Yorkshire (omitting Psocidæ and Ephemeridæ). By G. T. Porritt, F.L.S., F.E.S. ('Naturalist,' April, 1897, pp. 115–126.)

Imaginal Discs in Insects. By Henry S. Pratt, Ph.D. ('Psyche,' February, 1897, pp. 15–30.)

A New Hypothesis of Seasonal-Dimorphism in Lepidoptera. By A. G. Mayer. (*Op. cit.*, pp. 47–50.)

Ichneumonides d'Afrique. By Dr. J. Tosquinet. ('Mémoires de la Société Entomologique de Belgique,' v., pp. 430. 1896.)

Le Cocciniglie Italiane viventi sugli agrumi. Parte III. I. Diaspiti. By Prof. Antonio Berlese. Firenze. 1896. This part continues the work from p. 203 to p. 477. There are two hundred figures in the text, and twelve lithographic plates, two of which are coloured, and two others tinted.

A Check-List of the Coccidæ. By T. D. A. Cockerell. 'Bulletin of the Illinois State Laboratory of Natural History,' vol. iv., article xi. Springfield, Illinois: H. W. Rokker. 1896.

The Principal Household Insects of the United States. By L. O. Howard and C. L. Marlatt. With a chapter on "Insects affecting dry Vegetable Foods." By F. H. Chittenden. ('Bulletin' No. 4. New Series. U.S. Department of Agriculture. Division of Entomology.) Pp. 130, numerous figures in text. Washington: Government Printing Office. 1896.

Insects affecting Domestic Animals: an account of the species of importance in North America, with mention of related forms occurring on other animals. Prepared under the direction of the Entomologist, by Herbert Osborn. ('Bulletin' No. 5. New Series. U.S. Department of Agriculture. Division of Entomology.) Pp. 302, fully illustrated. Washington: Government Printing Office. 1896.

Insects affecting the Cotton Plant. By L. O. Howard, Ph.D. (U.S. Department of Agriculture. Division of Entomology.)

An Essay on the Development of the Mouth-parts of certain Insects. By John B. Smith, Sc.D. Pp. 24, plates 3. Reprinted, November, 1896, from Transactions of Amer. Philos. Soc., vol. xix.

New Mallophaga (pt. ii.), *from Land-Birds; together with an Account of the Mallophagous Mouth-parts.* By Vernon L. Kellogg. Pp. 118, plates 14. Palo Alto, California: Leland Stanford, Jr. University. 1896.

OBITUARY.

We regret to announce that Mr. Clarence Fry died suddenly on the golf links at Northwood, near Watford, on April 10th last. It may be said that indirectly we were largely indebted to Mr. Fry for our present knowledge of the insect fauna of the Hebrides, Shetlands, &c., as he at one time liberally supported professional collectors in their expeditions to these remote portions of the kingdom, and so fostered an interest which subsequently became more fully developed. His collection of British Lepidoptera, which comprised many local and rare species, was disposed of at Stevens's, March, 1896 (Entom. xxix. 164). Deceased was the well-known photographer of Kensington. He was about fifty-seven years of age.

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ON THE GEOGRAPHICAL DISTRIBUTION AND POST-GLACIAL DERIVATION OF THE PALÆARCTIC AND NEARCTIC ALPINE RHOPALOCERA FAUNAS.

By W. Harcourt-Bath.

In studying the intricate and complex themes which constitute the subject-heading of the present essay, a good deal will be gained from obtaining a preliminary insight into the theories of those botanists who have contributed treatises on the distribution and derivation of the alpine floras in the extensive regions under consideration.

The geographical and vertical distribution of the Rhopalocera in a very great degree is so intimately connected with the distribution of their pabula that it is reasonable to suppose they have closely followed the various migrations of the flora upon which they are so dependent, both antecedent to and after the termination of the glacial period. It follows therefore that, in order to intelligently comprehend their present distribution, as well as their post-glacial derivation, we must possess a certain knowledge of the closely kindred science of phyto-geography.

We will first of all take a glance at the geographical distribution of the alpine Rhopalocera fauna which exist at the present day upon the different and diverse mountain systems in the two regions under consideration. As the genus *Erebia* is the most extensive and typical group among the alpine butterflies, it will serve to illustrate with a certain degree of accuracy the facts relating to the whole.

In the Palæarctic and Nearctic Regions combined this genus numbers nearly sixty species,* all but seven or eight being confined to the first named, the remainder occurring exclusively in the Nearctic Area.

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* These and the following figures only profess to be approximately correct.

In the Palæarctic Region there are apparently six principal centres of distribution, three of them being situated in Europe and the other three in Asia. The Alps of Central Europe constitute the metropolis or headquarters of the alpine Rhopalocera fauna, containing in the genus *Erebia* alone as many as twenty-five species, that is, nearly one-half of the species inhabiting the whole of the northern hemisphere. On either side of them we have the Pyrenees and the Carpathians, containing about twelve and eleven species respectively; then there is a great gap until we arrive in Western Siberia, in the neighbourhood of the Thian Shan, with about eleven species; and the Altai and Amur, tending in a north-easterly direction, and containing respectively about fourteen and eleven species apiece. Both north and south of this great central series of mountain chains running through Europe and Asia the number of alpine forms of butterflies rapidly diminishes. Thus in Europe north of the Alps we have about seven species of *Erebia* in the Cevennes and Auvergne in South-eastern France, some six or seven species in the Jura, five each in the Vosges and the Riesengeberge, four in the Schwarzwald or Black Forest, four in the Hartz, and three in the Ardennes. All these mountain ranges are more or less in direct continuation of the great central alpine chain, of which they topographically constitute an integral part. In the Ural mountains, far away to the north-east on the confines of Russia in Europe and Siberia, about five species exist; in the Scandinavian mountains there are three, and in Lapland, still further north, four; while England and Scotland only possess two each, and Ireland one. Three of the species, however, which occur in the more northern limits of the distribution of the genus, are not true alpine forms. I refer to *Erebia ligea*, *E. æthiops*, and *E. medusa*, all of which are found in the Ardennes, and one in Great Britain; so that the only true alpine species which we possess in this county is *Erebia epiphron*, occurring upon the mountains of Cumberland and Westmoreland, the Grampians in Scotland, and the Connemara group in the West of Ireland. South of the Alps the same increasing paucity takes place precisely; thus in the various mountain ranges of the Iberian Peninsula there are only two or three, including one endemic form; while only one species, I believe, occurs on the elevated chain of the Sierra Nevada in the extreme south. The Apennines in Italy only contain four or five species at the outside, while the Dinaric Alps in Dalmatia and the Balkans in Turkey are in a similar predicament; two or three species only are found in the mountains of Greece, and three in Armenia and Asia Minor; while the very elevated and extensive but isolated chain of the Caucasus, in the same latitude as the Pyrenees, only possesses five or six. There are no species whatever inhabiting the range of the Atlas in Northern Morocco and Algeria.

Turning now to the remainder of the region: in Arctic Siberia to the north about five species occur; south of the central ranges their numbers diminish to two in the Persian Highlands, and a similar number in the vast chain of the Himalayas.

In the Nearctic Region, four species only are found in the Rocky Mountains, and five in the tundras of the north; while no species of this genus are found at all in the Alleghany or Appalachian system in the east.

Now what do the foregoing facts prove? In my estimation they furnish us with an approximate estimate of the extreme distance south to which the alpine Rhopalocera fauna were driven during the climax of the glacial period, at least in the Palæarctic Region.

In preglacial times these butterflies were probably found in company with their pabula throughout the whole of the northern portion of the Europasian Area, their range extending to well within the Arctic Circle. Upon the advance of the ice-cap they retreated south until they reached the six great chains of mountains which I have already described. Many of the species were probably unable to surmount the barriers which they furnished, and consequently perished; while the majority perhaps forced their way through them by means of transverse passes and valleys, and survived in the sheltered and more hospitable areas which they would provide immediately to the south. That the butterflies did not retreat much further equatorwards I am thoroughly convinced from the fact of so few species being found upon the mountain chains to their front Moreover, we have every reason to suppose that the climatal and phyto-geographical conditions must both have been favourable to their survival in the South of Europe especially, even during the climax of the glacial epoch; so that I cannot agree with Hofmann's hypothesis that the alpine Rhopalocera fauna was entirely driven out of Europe, the greater portion into Asia, and a few into Africa, from whence he supposes they returned when the climate again became warmer.

On the other hand, I think we might fairly assume with a certain degree of safety that a few species even survived in certain favourable spots to the north of the Alps, the Pyrenees, and the Carpathians, where the land was not submerged beneath the shroud of snow and ice with which most of the north of Europe was enveloped. At any rate there are some powerful reasons for supposing that the remainder of Europe south of the mountain chains indicated were capable of affording a safe refuge to the alpine butterflies, contrary to the views expressed by Hofmann, before mentioned.

I have given elsewhere (Entom. xxix. 320–324) my reasons for supposing that the alpine Rhopalocera fauna did not retreat as far south as the north of Europe during the glacial period. That the climatal conditions were not so severe as supposed by Hofmann in order to have extirpated the whole of the Rhopalocera fauna of Europe is proved by the paucity of alpine forms which are found on the various mountain ranges in the extreme south of the Continent at the present day. The same thing must have been the case in the other portion of the Palæarctic Area, judging from the fact that there are so few species found on the Himalayas and the mountains of Northern Persia to the south.

All these facts seem to prove that the great majority of the alpine forms of butterflies therefore found a sanctuary during the climax of the glacial period to the immediate south of the three great chains of mountains on either continent.

Hofmann is most probably correct in concluding that the great bulk of the European Rhopalocera fauna have been originally derived from the Asiatic Area, though not, as he supposes, after the termination of the glacial epoch; but I think he is incorrect in imagining that the post-glacial alpine forms were not directly derived from the south. According to the investigations of Sir Joseph Hooker, the alpine flora of the Himalayas, the Alps, and Pyrenees have had remarkably little lateral connection with each other in post-glacial times. It is reasonable to suppose therefore that the alpine Rhopalocera have accordingly not been directly derived from the East in a similar manner. The butterflies being so dependent upon the plants for their pabula must have been in large measure circumscribed by their migration. On the other hand, it may be probably true that the great majority of the Austral or Lowland forms immigrated westwards from Asia at the termination of the glacial epoch.

In the case of the Nearctic Continent, fully taking into consideration the more extreme glaciated conditions which prevailed there, I think the alpine butterflies were not driven any further south than the latitude of 30° N.; but there are so few alpine forms occurring in that region that it would not be safe to draw the line so closely as one is able to do in the Eastern Hemisphere. Moreover, the physical conditions of the two regions are very different, the elevated chain of the Cordilleras running at right angles to and crossing the equator, while all the principal mountain ranges of the Palæarctic Region are in the reverse direction, that is, nearly parallel with the equatorial belt. The fact that closely allied genera to that of *Erebia* occur in the Andes of South America, and again in the highlands of South Africa, may be explained on the hypotheses that they were derived from the regions to the north during the glacial epoch; in the former case by means of the elevated chain of the Cordilleras crossing the Equator, and in the latter by the assistance of the mountain ranges in Abyssinia and their continuance southward through Zanzibar. Whatever differences these butterflies possess at the present day in order to enable them to be placed in distinct genera from that of *Erebia* may be owing to the change effected in post-glacial times by reason of the differences experienced in the organic environment. The only other contingency I can discern is that these southern genera represent pre-glacial forms which existed in a cosmopolite condition, both geographically and vertically, in both hemispheres, as I have reason to suppose was the case with the genus *Œnis* or its immediate stirps in pre-glacial times (see Entom. xxix. 345–349).

Asia north of the Himalayas is probably the original home from whence the present alpine Rhopalocera fauna of both Europe and North America were indirectly or originally derived. In the former continent, during Miocene times, a very different fauna and flora existed to that which is the case at the present day. This fauna and flora, which was exceedingly rich according to the palæontological evidence, and partook of a subtropical nature, was, during the succeeding Pliocene period, gradually extirpated, and gave place to one which made its way from the east, more in harmony with the less genial climatal conditions which subsequently prevailed.

It was during this epoch, or the early part of the Pleistocene period which followed, that the present alpine Rhopalocera fauna of Europe or their immediate stirps was primarily derived. During the glacial period, as I have endeavoured to prove, the greater part of them survived in the more hospitable regions in the neighbourhood of the Mediterranean, the lowland forms only seeking a shelter further south still, namely, in Asia Minor and in Africa north of the Sahara Desert. It will therefore appear that Hofmann is incorrect in supposing that the whole of the post-glacial European Rhopalocera fauna have been directly derived from regions situated outside its pale. Not only am I supported in this contention from the fact of the extensive paucity of the alpine Rhopalocera in the South of Europe compared with the exceeding richness of that existing in the Alps and the Pyrenees, but also from the researches of Sir Joseph Hooker, who has proved the small amount of lateral connection also between the different mountain ranges as regards the derivation of their respective alpine floras.

Birmingham, March 17th, 1897.

CORDYCEPS ENTOMORRHIZA (DICKSON), A VEGETABLE ENEMY OF *HEPIALUS LUPULINUS* LARVÆ.

By F. V. THEOBALD, M.A., F.E.S.

WE are all well acquainted with the fungoid disease, *Empusa musca*, that often causes such havoc amongst the abundant house fly and other Diptera, but beyond this we do not often come across vegetal parasitism in insects in this country, although some seventeen insect fungi are recorded. It is only when insects are present in very large and abnormal numbers that these parasitic diseases, due to vegetable parasites, seem to appear. Recently there seems to have been a considerable increase, anyhow in cultivated areas, of the larvæ of the garden swift moth (*H. lupulinus*), especially in the south-east of England, and notably in Kent. Not until recently, however, have I been able to detect any natural enemies at work upon them, save a single species of *Anthocoris*, which I have referred to before in these pages, but which I am sorry to say has had no effect in lessening their numbers, and so helping to allay the damage the ravenous *H. lupulinus* larvæ occasion. During the latter part of February, Mr. Kennard, of Linton, in Kent, sent me a number of so-called "vegetable caterpillars," which he could not account for, and which he had noticed in his garden in certain areas on and off for the last fifteen years. These turned out to be the larvæ of *H. lupulinus* that had been invaded by a parasitic fungus of the genus *Cordyceps*. Although many of the specimens differ very much in form from the previous figures, they are undoubtedly those of the species *entomorrhiza* described by Dickson * in 1785, and subsequently noticed by Tulasne, Saccardo, Currey, Cook, and others.

Many of the larvæ showed no signs of having been invaded by a fungus, they simply remained in the soil as yellowish brown shiny bodies, like "mummies" of *Hepialus* larvæ. On cutting these open, they were seen to be full of a solid white or creamy mass of matter, which under the microscope was shown to be composed of closely compacted fine mycelial threads. This fungus completely invades the larva, and even destroys the chitinous skin, yet retains most perfectly every detail of the larval structure. A number of the larvæ were covered externally by a white or dirty-yellow coarse mycelium, especially over the anterior half of the body (figs. 1 & 2 *b*); this is also noted by Cook in his 'Vegetable Wasps and Plant Worms.' Others, and those that are most interesting, have developed and proceeding from the side or beneath near the head the large fruit-bearing body so characteristic of the genus *Cordyceps*. This structure grows out from the buried larva into the air. It is swollen at the free end, and the stem in old specimens is deeply striated longitudinally

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* Plant. Crypt. Britt., p. 22, t. 3, fig. 3. Dickson, 1785.

(fig. 3); other specimens, especially before they are ripe, have smooth stems (fig. 2). This solid stem, which is variable in length, according to the depth of the larva under the ground, is sterile, the spore-producing area being the globose capitulum (fig. 1 *a*). Several specimens resembled Greville's *C. gracilis*,* which is now considered merely a variety of *entomorrhiza* (fig. 1 *b*). The clubbed erect body is reddish brown, and in some darkened at the capitulum, others have rusty brown capitula, whilst yet others are yellowish, resembling the variety recorded by Greville from Shetland. Internally the globose head contains a number of cavities, or perithecia, when ripe, embedded in the soft stroma of the capitulum. Each cup-shaped perithecium opens to the exterior by a small round aperture, when the spores contained in them are ripe. There are eight thread-like filaments in each perithecium, which break up into a number of oblong spores. These spores are then passed out of the openings on to the soil and in the air, a

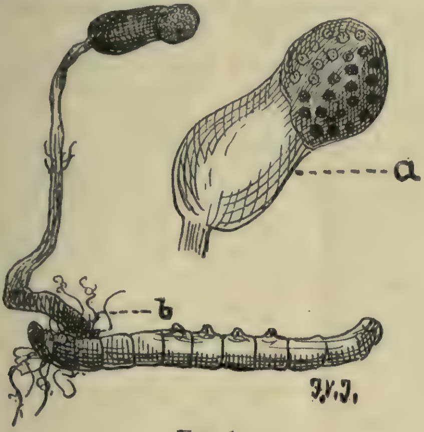

FIG. 1.

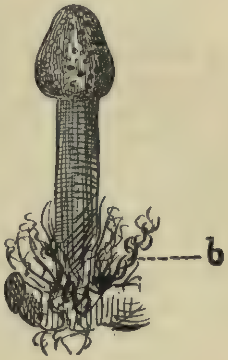

FIG. 2.

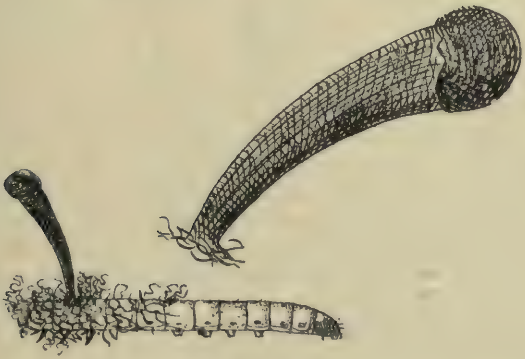

FIG. 3.

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* Scot. Crypt. Flora, pl. 86.

necessary item in the distribution and increase of this parasite. The "fruits" last for a considerable time, but shrivel up when dried, and decay away from the "mummy" larva below long before the larva becomes disintegrated. Sometimes the parasitised larvæ lie flat in the ground, but the majority, especially those with the fruit-bearing body, are at right angles to the surface of the soil. One some distance from the surface had the stem quite white, much bent, and three inches long.

Through the kindness of Mr. Kennard I had the opportunity of examining these creatures in the soil. They were only to be found round peony roots, and seldom more than two feet away from the plants, although living *lupulinus* larvæ could be found in all parts. This fact of their presence only near peony roots may be of some importance in regard to the life-history of this fungus, possibly some of the early stages may take place on that plant. The life-history of none of these fungi is known. Some authorities suppose that the various *Isarias* that also affect insects are stages of *Cordyceps*. Cook, however, we must remember, seems to have found them in abundance at the roots of coltsfoot at Hitchin.

Many of these "vegetable larvæ" and the earth in which they were found were obtained with the idea that other areas might be infected with this disease. Experiments in this direction have not been altogether satisfactory, although numbers of sound *lupulinus* larvæ from other localities kept in this contaminated soil became invaded by this fungus when kept in a damp heat. Those kept in a dry heat showed no signs of being attacked.

Several other kinds of "surface larvæ" (Noctuæ) were also subjected to the same treatment, but none developed the disease, although kept under exactly similar conditions as the *Hepialus* larvæ. The ripe spore germinates rapidly if placed on a healthy larva of the latter genus, the mycelial thread entering the spiracle, and commences at once to invade the organs, leaving the alimentary canal until last. As a rule the larva seems to have reached maturity before it dies, but I have found some quite small larvæ dead in the soil.

At present our knowledge of the vegetal enemies of insects is not sufficient to enable us to carry out any experiments successfully in regard to their use as a means of keeping down an excess of insect pests. The only good results attending such experiments have been in regard to *Isaria densa*,* of Giard, a parasite that has been sufficiently abundant in France to be cultivated on a large scale and sold to farmers as a means of destroying the "white grubs" of the Melalonthidæ, a family much subject to vegetal parasites, species of *Cordyceps* often being abundant on them. Some success has also attended Professor Snow's employment and distribution of the *Sporotrichum globuliferum* of Spegazzini, as an antidote for the destructive "chinch bug" in the States There seems some doubt, however, about the identity, &c., of the fungus employed in the latter case. Before any really successful work can be done in this subject, if it is to be done, we must know a great deal more of the life-history of the parasitic insect fungi than we do at the present time.

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* 'Comptes Rendus,' p. 1079.

Wye Court, Wye, April 2nd, 1897.

ON A NEW SPECIES OF *PAPILIO* FROM UGANDA.

By the Hon. Walter Rothschild.

Papilio mimeticus, sp. nov.

This most remarkable butterfly is closely allied to *Papilio rex*, Oberth.; but while that species is almost the exact mimic of *Melinda formosa*, Salv. & God., *Papilio mimeticus* mimics *Melinda morgeni mercedonia*, Karsch.

♂ *Upper side.*—Fore wings: differ from *P. rex* in having the basal area deep chestnut instead of orange-rufous; in this chestnut area is a longitudinal pale streak behind cell, not present in typical *P. rex*. The creamy spot near apex of cell is half obliterated. The cream-coloured discal spots are much smaller, and four in number instead of seven; those between veins four and six and the one between veins seven and eight being absent. The submarginal spots are much smaller. Hind wings: basal white spots much smaller, the first one before the cell almost obliterated by black scales. The fourth discal spot between veins two and three reduced to a tiny line; of the remaining discal series only one is present; those between veins three and six absent; that one between veins six and seven reduced to a mere dot. The double row of post-median spots much reduced in size. One of the most striking differences, however, between *P. rex* and *P. mimeticus* is that while in *P. rex* the ground colour of the hind wings is uniform black, in *P. mimeticus* the disc of the wing is dull chestnut, this colour extending along the abdominal margin to near apex of vein.

Under side shows the same differences as above, in addition to which the two anterior white marginal spots are absent. The two discal spots between veins four and six, though much reduced in size, are also present. On the hind wing the first basal creamy patch has no black scaling, and there is an additional discal creamy spot between veins five and six. Also the chestnut disc of hind wings is not so distinct as on the upper side. Oberthür, in his original description of *P. rex* (Bull. Soc. Ent. Fr. 1886, p. 114), says: abdomen black above, white on sides and below; but in my specimen of *P. rex* from Uganda Protectorate the under side is black with a narrow but distinct median white line, and in this agrees entirely with *P. mimeticus*.

Hab. Msarosaro, Uganda, December 20th, 1896.

This is the choicest capture of a very fine collection sent me by Dr. Ansorge, whose care in labelling and collecting ought to prove a lesson to all entomologists.

ON THE GENUS *GYMNOPLEURUS*, ILLIGER; WITH A LIST OF SPECIES AND DESCRIPTIONS OF TWO NEW GENERA.

By JOHN W. SHIPP.

(Concluded from p. 135.)

PROBABLY *virens*, Erichs, will be found to be synonymous with *lævicollis*, Cast.; but I have not thoroughly satisfied myself yet on this point.

Wahlbergi, Boh., is not quite distinct from *splendens*, although regarded as such by some authors. It is, however, a good variety of *splendens*.

I have placed *thoracicus*, Har., as a var. of *ignitus*, Klug., as I have seen varieties which are intermediate between the two, and I only regard *thoracicus* as the extreme highly-coloured form of *ignitus*.

The existing genus may be further divided as follows:—

A. Species having the posterior angles of thorax produced into a distinct obtuse point, and having the basal half of the lateral margins of thorax strongly emarginate and slightly reflexed. Body generally flatter. First segment of abdomen with the side margins straight or slightly convex, edged with a very strong longitudinal carina. Frontal carinæ never extending past the disc of head - - - *Paragymnopleurus*, Shipp.

B. Species having the posterior angles of thorax blunt, basal half of lateral margins of thorax bicarinate. First segment of abdomen concave, with no marginal carinæ extending the whole length; the carina being broken and evanescent in the centre. Frontal carinæ produced at the base of head, convergent.

  a. Frontal carinæ always visible. Epipleura of elytra not produced into a spine near the humeral angles - - - - *Gymnopleurus*, Ill.

  b. Frontal carinæ obsolete or nearly so at base of head. Epipleura of elytra produced into a short sharp spine near the humeral angles. *Spinogymnopleurus*, Shipp.

PARAGYMNOPLEURUS, n. g.

Clypeus dentate and slightly reflexed in front, with the edge split into six teeth, the basal two mostly obsolete, or with the front produced and sharply cleft. Frontal carinæ only reaching the centre of the head; sides produced so as to almost divide the eyes. Labial palpi 3-jointed; the first very large and broad, the second smaller, and the apical joint very small and rounded. Labial palpi and labrum very hairy. Maxillary palpi 4-jointed:

basal joint very small, rounded; second joint longer; third, half as long as the second; and the apical joint swollen in the middle, and as long as the other three. Mandibles membranous. Antennæ 9-articulate, the first joint having the base produced and narrowed almost to a point at the junction with the head; the last three forming the club. Thorax more or less trapezoidal; anterior portion narrow, with the angles acute; lateral margins curved outwards, with the basal half strongly emarginate. Posterior angles produced to a distinct point, with the posterior margin slightly curved; a deep cicatrix on each side near the lateral margins. Base of elytra as wide as thorax; humeral angles pronounced; lateral margins very strongly sinuated just below the humeral angles. Epipleura of the elytra scarcely visible, except at the base; apical prominences generally pronounced, with the apical angles very acute. Dorsal surface of the first, second, and part of third distinct in the elytral sinuation; pygidium triangular. Metasternal keel rather prominent. Anterior tibiæ with three sharp teeth at apex of exterior margin, the rest of the margin being serrated. The apical spine is broadly bispined in the males. Anterior femora with a small but distinct tooth or tubercle in the centre of the longitudinal carinæ. Spurs at the apices of the intermediate and posterior tibiæ not soldered. Posterior tibiæ rather strongly curved inwards at extremity, with each of the longitudinal carinæ distinctly serrated, obliquely truncated at apex.

Type of the genus, *sinuatus*, Fb.

The following may be referred to *Paragymnopleurus*:—*assamensis*, Waterh.; *melanarius*, Har.; *morosus*, Fairm.; *azureus*, Fab.; *splendens*, Cast.; *latus*, Hope; &c.

GYMNOPLEURUS, Illiger.

Clypeus not so sharply dentate, mostly only cleft in centre, sometimes 4-dentate. Frontal carinæ extend to the base of head, and convergent. Trophi the same as in *Paragymnopleurus*, except that the basal joint of the labial palpi is always much narrower and more rounded. Labrum not contracted towards apex. Thorax and anterior margin contracted, angles acute, sides rounded, posterior angles not prominent, almost obsolete in some species; posterior half of lateral margins bi-emarginate. Basal portion of elytra hardly as wide as thorax; elytral sinuation strong. Epipleura of elytra obsolete, the lateral margins being vertical and widely bicarinate the whole length; rather strongly truncate at apex. Dorsal surface of the first segment of the abdomen not visible, the carina meeting with the margin of the elytra; the exterior portion of the first segment of the abdomen visible is the sides, which are rounded, and not carinate on the outermost portion. The second segment has the dorsal surface visible, and is carinated on the exterior portion, when the carina becomes evanescent; the carina then runs to the pygidium, which is triangular, with an obtuse apex. Mesosternal keel rather pointed. Anterior tibiæ with three teeth on exterior margin, and with the apical spine obtusely pointed in the males. Anterior femora with a small tubercle in the apical third. Intermediate and posterior tibiæ as in *Paragymnopleurus*, but rather shorter; tarsi laterally compressed.

Type of the genus, *G. geofroæ*, Fuessl.

The following may be referred to the genus *Gymnopleurus* as restricted:—*flagellatus*, Fab.; *sturmi*, Macleay; *aciculatus*, Gebler; *lacunosus*, Klug.; *fulgidus*, Oliv.; *olivieri*, Cast.; *ignitus*, Klug.; *bicolor*, Latr.; *corruscans*, Wied.; *cœlatus*, Wied.; *kœnigi*, Fab.; &c.

Spinigymnopleurus, n. g.

Much the same as *Gymnopleurus*, but differs in having the anterior tibiæ shorter, and the teeth on the exterior margins wider apart. Frontal carinæ scarcely visible to base. The posterior angles of the thorax are terminated by small tubercles. The lateral carinæ of the first segment of the abdomen runs from near the humeral curve towards the centre of the elytra and meets the upper carinæ, which runs round the margins of the elytra. The extreme posterior portion of the first segment of the abdomen is simply carinate, whilst the anterior portion is bicarinate. The second segment is rounded at the sides, with the carinæ reflexed close under the lateral margin of the elytra. The lateral margins of the elytra are similar to *Gymnopleurus*, except that they have a sharp spine at the curve opposite the humeral prominences, just as the sinuation begins. This spine is slightly pointing outwards, and is situated on the extreme margin.

Type of the genus, *tristis*, Cast.

The following may be referred to this genus:—*plicatus*, Fairm.

NEW SPECIES OF SOUTH AMERICAN EUMOLPIDÆ.

By Martin Jacoby, F.E.S.

Chalcoplacis gigas, n. sp.

Metallic violaceous-blue; the basal joints of the antennæ fulvous; head distinctly, thorax finely and closely, punctured; elytra semi-regularly punctate-striate. Length, ♂, 3 lines, ♀, 4½ lines.

Of broad, subquadrate-ovate shape, entirely dark blue; the head rather strongly but not closely punctured, slightly transversely depressed between the eyes; clypeus more strongly punctured, its anterior edge concave; the antennæ not extending to the middle of the elytra, the basal joint blue above, the following two joints fulvous, the rest black, third and fourth joints equal, terminal joints thickened; thorax in the male at least three times broader than long, the sides strongly rounded and widened at the middle, the anterior angles slightly produced outwards, the surface finely and rather closely punctured, the interstices at the sides slightly wrinkled and with a rather obsolete fovea; scutellum much broader than long; elytra not wider at the base than the thorax, with a short transverse depression below the base, scarcely more strongly punctured than the thorax, the punctures arranged in closely approached semi-regular rows, distinct to the apex; below very sparingly pubescent; femora rather swollen.

Hab.—Cayenne.

Of this, the largest species of the genus, I possess a male and female specimen; the latter is of almost double the size and width, but does not differ in other respects; both sexes are of a much more ovate shape than is generally the case with species of this genus.

CHALCOPHANA IMPRESSIPENNIS, n. sp.

Dark rufous; the antennæ (the basal three joints excepted), the apex of the tibiæ, and the tarsi blackish blue; thorax irregularly punctured; elytra finely punctate-striate, metallic cupreous or green, margined with fulvous at the sides, the disc with two or three short costæ below the base, the latter with oblique deep humeral depression. Length 4½–5 lines.

♀. Head rather finely and sparingly punctured at the vertex, the middle with a fovea, more strongly punctate; clypeus subquadrately elongate, smooth, bounded behind by a deep groove; labrum and palpi rufous; antennæ long, bluish black, the basal three joints rufous; thorax strongly narrowed in front, the anterior angles acutely produced, the sides strongly rounded, the disc irregularly impressed with larger and smaller punctures; scutellum rufous; elytra much pointed posteriorly, cupreous or green, the lateral margin and the epipleuræ narrowly rufous, the shoulders bounded within with a deep, oblique, longitudinal depression, followed by two or three very short costæ at the sides, the depression deeply punctured, the rest of the disc finely and evenly punctate-striate, the rows not geminate and rather distant, the punctures finer towards the apex, the suture raised at the posterior half; under side and legs rufous; the apex of the tibiæ and the tarsi blackish blue, clothed with yellowish pubescence; breast and abdomen impunctate; the prosternum smooth, rather broad.

Hab.—Bolivia.

I only know the females of this species, which is one of the largest of the genus and distinct on account of the deep intrahumeral groove of the elytra and the short costæ below this groove at the middle of the sides; but whether this species is but the female of *C. suavis*, Har., which is described as having neither basal depression nor costæ, it is impossible to say, since the author does not mention what sex he had before him.

CHALCOPHANA BOLIVIANA, n. sp.

Fulvous; the antennæ (the basal two joints excepted), the tibiæ, and tarsi black; thorax impunctate; elytra dark bluish, the apex greenish, finely punctate-striate, the sides with three short costæ at the middle. Length 4 lines.

♀. Head nearly impunctate, with a few fine punctures only, the middle with the usual fovea; clypeus broad, convex, impunctate; antennæ black, the basal two joints fulvous, terminal joints distinctly thickened; thorax strongly transverse, the sides rounded, the anterior angles thickened but not prominent, the surface nearly impunctate or with some extremely fine punctures, fulvous; scutellum of the same colour; elytra rather finely punctured in single rows, which become geminate here and there below the middle, below the base is a distinct depression which is followed by three short costæ, the shoulders are acutely raised as well, and a longer costa below them extends to the apex at the sides; under side and femora fulvous; the entire tibiæ and tarsi black.

Hab.—Bolivia.

Of this species, of which three specimens are contained in my collection, I also know only the female; the elytra are of rather peculiar coloration, bluish anteriorly, greenish near the apex. The species may be known by the nearly impunctate head and thorax and the black tibiæ and tarsi.

(To be continued.)

NOTES ON THE SYNONYMY OF NOCTUID MOTHS.

By Arthur G. Butler, Ph.D., F.L.S., &c.

(Continued from vol. xxix. p. 284.)

Abrostola, *Ochs.*

Walker's second species of *A. ovalis*, Guen., is *A. asclepiadis*, and (on turning up the reference to the register of accessions) I find that it is a European specimen purchased from Becker. Walker's carelessness in making certain of the localities recorded in his catalogue has been a source of considerable confusion. *Inguridia abrostoloides* is an *Abrostola* near *A. urentis*.

EURHIPIDÆ.

Ingura, *Guen.*

Ingura abrostoloides.

Ingura abrostoloides, Guenée, Noct. 2, p. 311, n. 1119 (1852).
Edema producta, Walker, Lep. Het. 5, p. 1031, n. 4 (1855).
United States. In Coll. B. M.

Abrostola devincta, Walk., is allied to this species, and still more closely to *Ingura fuscescens*, Walk., which is a variety of *I. lunodes*, Guen., without the whitish apical spot.

Ingura lunodes.

Ingura lunodes, Guenée, Noct. 2, p. 310, n. 1117 (1852).
Edema fuscescens, Walker, Lep. Het. 5, p. 1031, n. 5 (1855).

Rio Janeiro, Honduras, St. Domingo, and Jamaica. In Coll. B. M.

"*Ingura subapicalis*" and *I. cristatrix* differ from typical *Ingura* in their upright slender palpi; those of the New World species being broad, thickly scaled, and porrected. The Indian species I have called *Callingura.*

EUTELIIDÆ.

EUTELIA, *Hübn.*

Eutelia dentifera.

Eutelia dentifera, Walker, Lep. Het. Suppl. 3, p. 818 (1865).
E. pulcherrima, Grote (see Check-List, p. 33, n. 816).

United States. In Coll. B. M.

It is possible that Grote's name may have priority; but as his Check-List gives no references I cannot settle the point. I leave it to those who know where to look for the description.* *E. exquisita*, Saalm., appears to be the same as *E. bowkeri*, Feld. Both figures are bad, but Saalmüller's is by far the worse of the two. We have *E. bowkeri* from Kilima-njaro.

MARASMALUS, *Grote.*

Marasmalus inficita.

Eutelia inficita, Walker, Lep. Het. Suppl. 3, p. 818 (1865).
Marasmalus histrio, Grote (see Check-List, p. 33, n. 818).

United States. In Coll. B. M.

TARGALLA, *Walk.*†

Cryassa, Walk., and *Penicillaria* (part), Guen.

Targalla bifacies.

Cryassa bifacies, Walker, Lep. Het. xv. p. 1745 (1858).
Eutelia impleta, Walker, *l. c.*, Suppl. 3, p. 822 (1865).

Ceylon. Types in Coll. B. M.

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* These notes were all written before the publication of Prof. Smith's useful Catalogue.—A. G. B.

† In this genus the antennæ are simple in both sexes.

Targalla repleta.

Eutelia repleta, Walker, Lep. Het. Suppl. 3, p. 821 (1865).
E. plusioides, Walker, *l. c.*, p. 822 (1865).

Ceylon and S. India. Types in Coll. B. M.

Targalla palliatrix.

Penicillaria palliatrix, Guenée, Noct. 2, p. 305, n. 1113 (1852).
Targalla infida, Walker, Lep. Het. xiii. p. 1008, n. 1 (1857).
Penicillaria ludatrix, Walker, *l. c.*, xv. p. 1773 (1858).

Java, Moulmein, and Ceylon. Types in Coll. B. M.

PENICILLARIA, *Guen.*

Penicillaria nugatrix.

Penicillaria nugatrix, Guenée, Noct. 2, p. 303, n. 1110 (1852).
Eutelia simplex, Walker, Lep. Het. Suppl. 3, p. 824 (1865).

Almorah and Jubbulpore. In Coll. B. M.

Walker simply noted the Almorah specimens as from North India. His type of *Eutelia simplex* is a broken and somewhat rubbed example, without any locality label.

NOTES AND OBSERVATIONS.

THE COMMA BUTTERFLY OF AMERICA.—In "Some Miscellaneous Results of the Work of the Division of Entomology" * Mr. Howard, the entomologist, gives an interesting account of two species allied to our *Vanessa* (*Polygonia*) *c-album*. These are considered under the heading "Hop Merchants," a term generally used in reference to the chrysalids, but sometimes applied to the imagines also. He says, "An interesting superstition holds among hop-growers, to the effect that when the golden-spotted chrysalids are plentiful the crop will be good and the price high, while if the silver-spotted ones are plentiful and the golden ones are scarce the price will be low."

The two species dealt with are *Polygonia interrogationis*, Godart, and *Polygonia comma*, Harr. The last named is the smaller species, and almost exactly identical with our Comma butterfly.

In his remarks on the habits and natural history of *P. comma*, Mr. Howard states: "In the hop-growing regions of New York the insect is double-brooded, the butterflies hybernating and flying in the early spring, living on into the latter part of May and even June. The first brood of caterpillars lives, in the main, upon elm; and young elm trees recently set out are frequently injured by the loss of almost their entire foliage in the spring. . . . . Aside from the elm, this early brood may also feed upon nettle and false-nettle. The adult butterflies developing from the first brood of larvæ begin to breed at the end of June, and fly until late in August. In hop-growing regions the majority of the eggs of this set of butterflies are laid upon hop-vines. The resulting caterpillars feed well on in August, and the butterflies which are to hybernate make their appearance from the latter part of this month until the latter part of September. They enter hybernating quarters almost immediately, since they are rarely seen in October. . . . . The hybernating form has been called *harrisii*, and the summer form *dryas*. The distinction between the two forms is not as marked as with the preceding species (*P. interrogationis*), nor is the relegation to distinct broods as marked. . . . . In its southern range the species is three-brooded, the first brood being composed of *dryas*, the second of both forms, and the hybernating brood of *harrisii* only."

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* Bulletin No. 7, New Series. U. S. Department of Agriculture. Division of Entomology. Washington, 1897.

The ova of *P. comma*, like those of *P. interrogationis*, are deposited in depending columns or chains, varying in number from two to nine eggs. "Frequently several of these columns will be found upon a single leaf, usually upon the under surface, but occasionally upon the stem or upon the tendrils. Although frequently a large number of eggs are thus found upon the same leaf, the caterpillars are in no sense gregarious. On hatching they almost invariably migrate to other leaves, and each one lives singly. At first it feeds without concealment on the under surface of the leaf, then it begins to draw the outer edges together by silken threads as a sort of protection, apparently, from the daylight, as it feeds mainly at night. The young larvæ are dark-coloured and nearly black, but grow lighter with successive moults."

Seeing how very much alike are the imagines of the English and American Comma butterflies, it seems remarkable that the method of egg-laying and the habits of the larvæ should be so very different in the two species. Mr. Frohawk, in his very detailed account of the life-history of *V. c-album* (Entom. xxvii. pp. 257–262, 287–289), says, "The ova are laid singly, and principally on the upper surface of the leaf, and generally many upon one leaf" (*l. c.* p. 258). Then, with regard to the habits of the larvæ, he states (*l. c.* p. 262) that they are gregarious, "living in small companies, but sometimes many will crowd upon a certain leaf."—R. S.

SESIA TIPULIFORMIS AN INJURIOUS INSECT.—Among other interesting articles dealing with injurious insects in the March issue of the 'Journal of the South-Eastern Agricultural College' is one on *S. tipuliformis*, an insect that is not always well represented in collections. It would appear, however, that in some places at least the species is common enough to be regarded as a pest. Under the name "Currant Borer," it is well known to fruit growers, and seems to be dreaded by them for the havoc it creates among all kinds of currant bushes. Certain suggestions are advanced, as being more or less likely to prevent attack or to clear out the insect from any place it may be in possession of. Probably a good plan would be to invite one or two practical entomologists to visit the infested plantation about the end of April or beginning of May, when the *Sesia* is in pupa; the prunings would be removed and effectively disposed of, at any rate the insects produced from them would never have a chance to renew their attack.

Gynandromorphous Lepidoptera.—Herr Oskar Schultz has published a list of Gynandromorphous (Hermaphrodite) Macro-lepidoptera of the Palæarctic fauna. He refers to the literature of the subject, and gives particulars of instances which were not previously known or recorded. The 366 (123 species) enumerated are distributed among the families as follows:—Rhopalocera, 151 (48 species); Sphingidæ, 43 (39 species); Bombycidæ, 134 (39 species); Noctuidæ, 11 (9 species); Geometridæ, 27 (16 species).

Attention may also be called to "Die Lepidopteren-Zwitter meiner Sammlung." This is a list of 161 gynandrous specimens in the collection of the author, Herr Max Wirthott, of Breslau; there are four plates, on which 72 of the examples are represented. Since the year 1761 about 400 cases of gynandromorphism in Lepidoptera have been made known.

Uniformity in Setting Lepidoptera.—With reference to this subject, one of the reasons put forth by some of your correspondents in favour of the adoption of the foreign method of setting, in substitution for that more generally in use in this country, appears to be that those entomologists who study continental as well as British Lepidoptera cannot do so conveniently, on account of the unsightly appearance given to their collections by having a mixture of high- and low-set insects in their cabinets. This is undoubtedly a drawback to those of us who are fortunate enough to be able to extend their studies to the continental species, but surely the difficulty can be got over by having separate collections of British and continental specimens—all those insects captured abroad being kept in a distinct collection from those captured in this country. This might not perhaps afford *quite* the same convenience in comparing British and foreign examples of the same species, but surely the extra trouble of comparing two series of insects in two separate cabinet-drawers, instead of in the same drawer, would be trivial. Whether the high or low method is the best is, and always will be, a matter of opinion. Each very likely has its own advantages over the other. To my mind the "happy medium" of having the insect set at the centre of the pin, as described by Mr. Tunstall (Entom. xxix. 300), is the best. This method keeps the insect well off the bottom of the drawer, without giving it the "painted cardboard" appearance which is always suggested to my mind on looking at a specimen set in the strict continental style. I rather fancy this "happy medium" has been very largely adopted in this country by most of our leading entomologists (I mean those who collect only British species and who have not taken up the continental system of setting), and it is erroneous nowadays to suppose that "British setting" means allowing the insects to rest on the bottom of the drawer of the cabinet. Uniformity in the setting of British specimens is most desirable for very many obvious reasons, and if the leading entomological societies of this country would act on the lines suggested by Mr. Tunstall, they would be doing an excellent work; but I cannot see the necessity for the adoption of the continental method.—H. Ainslie Hill; 9, Addison Mansions, Kensington, W.

I did not reply to the criticism on my remarks before, because I wanted to see the opinions of others. As, however, so few have taken part in the discussion, I can only come to one conclusion, *viz.* that British collectors do not intend to adopt the flat unnatural method. Mr. Jacoby has not a word to say in favour of the unnatural style, but only abuse for the natural style,—the "exploded idea of looking natural" Mr. Jacoby chooses to call it,—and he says that putting insects on pins is not natural. He says our insects rest on the bottom of the cases. In old collections it might have been so. Certainly no modern collections are so set. I can quite understand any foreigner, accustomed to see (in his own country) insects set in any particular way, thinking therefore such way must be the proper one, but that is no reason why it should be so. Yes, I distinctly remember seeing the cases of Mr. Elwes exhibited at the Entomological Society a few years ago, and remarking to a neighbour how unlifelike and wooden they looked, and he quite agreed with me. Mr. Jacoby wishes to know the advantage of the "natural" method. It speaks for itself, I should think, in being more lifelike, coming as near Nature as possible.—W. DANNATT.

[We fear that some of our correspondents are rather wandering from the main subject in this discussion. The point appears to be—Is it possible for lepidopterists in this country to arrive at some understanding with regard to the preparation of specimens for the cabinet, so that there may be something more nearly approaching uniformity in setting than exists at present? The high-flat system has been advocated because it seemed to those who have adopted it to possess advantages over any modification of the English method. If, however, the continental style does not commend itself, one is not compelled to accept it. In fact, one is not bound to set one's specimens in any particular style, or even to set them at all. The whole thing is entirely a matter of individual fancy, and so long as exchange negotiations are not entered upon, no one will venture to object. When, however, it is considered desirable to extend a collection by exchange, the question of uniformity in setting will present itself, and it seems only reasonable to assume that the convenience of the minority will have to give way to the requirements of the majority.—ED.]

TEMPERATURE AND OTHER EXPERIMENTS ON LEPIDOPTERA.—At the Royal Society's Soirée, which took place on May 19th last, Dr. Standfuss exhibited some of the remarkable specimens he had obtained by the application of artificial temperature, either during the pupal stage of a species, or throughout its metamorphoses from the egg. In another series there were examples of the results of crossing between the typical forms and well-defined varieties of a species. All these most interesting, and in some cases extraordinary, specimens, together with a selection of the artificial temperature forms bred by Mr. Merrifield (also exhibited at the soirée), are now to be seen in one of the table-cases in the insect gallery at the Natural History Museum, South Kensington. We would strongly advise all who are interested in the variation of Lepidoptera to take an early opportunity of seeing this very instructive exhibition, which will probably only be accessible, in its present complete form, for a limited period.

Hybrids.—Any information, either original or previously published, respecting hybrids, will be most acceptable to Mons. A. Suchetet, Chateau d'Antiville, par Bréauté (Seine Inférieure), who is engaged upon a book dealing with hybrid insects, fishes, and reptiles.

CAPTURES AND FIELD REPORTS.

Acronycta alni at Trefriw, North Wales.—A fine specimen of this moth emerged from the pupa this evening in my breeding-cage. I obtained the larva on the 5th of last August, sitting in a semicircular position on an alder leaf. I put a small piece of rotten wood in the cage, into which it bored its way in about three days afterwards, closing up the hole in such a way that it was almost impossible to detect it. The gallery is just two inches long, the pupa and shrivelled-up skin of larva occupying the farthest half.—Francis D. Bland; Trefriw R.S.O., North Wales, May 17th, 1897.

Abraxas grossulariata bred in December.—On October 15th last, my attention was called to a larva of *Abraxas grossulariata* in the last stage. This I took indoors; it pupated on Nov. 19th, and the moth emerged on Dec. 24th. No doubt this was a case of partial second brood, but had I left the larva in the garden it would probably have died instead of pupating. On the 14th inst. I took a nearly black larva of this species, showing only traces of the usual white and orange markings.—Alfred Sich; Villa Amalinda, Burlington Lane, Chiswick, May 17th, 1897.

Lepidoptera in 1897.—Looking at the fact that an exceptionally small number of items for the "Captures and Field Reports" section have been received, it would appear that either collectors are very busy, and so leaving their records for a later period; or that insects are scarce, and consequently there is little to chronicle. I am rather inclined to suppose that the entomological season so far has not been altogether brilliant. Last Saturday (May 15th) I put in a few hours in the afternoon at Northwood, in Middlesex; the only Lepidoptera that I observed were a few specimens of *Syrichthus malvæ*, and one or two species of Tineæ. Very few larvæ were obtained, and with the exception of *Tæniocampa populeti*, which were very small, I failed to meet with any of the species I have found at the same time and place in other years.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W., May 20th, 1897.

Velia currens, *Fabr.*, in Scotland.—I have in my collection three examples of the macropterous form of *V. currens;* they were taken during the month of August, 1893, at Musselburgh from the river Esk, where this form was quite common.—R. M. Leake; 15, Alleyn Park, W. Dulwich, S.E., May 2nd, 1897.

Acherontia atropos at Beverley, 1896–7.—During the autumn of last year about thirty larvæ and pupæ of this moth were found in and around Beverley; but only six have produced perfect insects so far. These were all reared by S. Copeland; five emerged in October, while the sixth delayed appearance until April 17th; all having been treated the same way, and kept in the house. Several collectors have lost pupæ;

D. Malton obtained seven, Dr. Savage four, R. Cherry one, and myself five, but all failed to come to perfection. Other collectors have single pupæ still living—Mrs. Hewetson, Mrs. Bruce, Mr. R. C. Hugill, and Mr. T. Dixon. They have for the most part been kept either under soil occasionally damped, or on the soil covered with moss which has been kept slightly damp. Some larvæ pupated on the top of the soil, others under it. I should be glad to know whether this has been a correct method of forcing them, and whether any have been known to be reared without being damped; also what bad effect gentle handling has upon the pupæ.—(Rev.) A. Newenham; Beverley, Yorkshire.

[The treatment of the pupæ of *A. atropos* has frequently been referred to in recent volumes of the 'Entomologist'; see *ante*, p. 75, and xxix. p. 262.—Ed.]

SOCIETIES.

Entomological Society of London.—*May 5th*, 1897.—Mr. Roland Trimen, F.R.S., President, in the chair. Mr. C. H. Peers, of Harrow Weald, was elected a Fellow of the Society. Mr. J. J. Walker exhibited an earwig, *Apterygida arachidis*, Yersin, new to Britain, and recently found in large numbers in chemical works at Queenborough. It had been probably imported among bones. Mr. Burr also showed a complete series of the British species of Forficulidæ. Mr. Enock showed eggs of *Stenopsocus cruciatus*, L., containing parasitic larvæ of *Alaptus fusculus*, Hal., the male of which would probably prove to be *Alaptus minimus*, Hal. Mr. Merrifield exhibited the results of temperature experiments on the pupæ of *Pieris daplidice*, *Melitæa didyma*, and other species. He thought that changes produced by abnormal temperatures might be classed as follows:—1, enhancement or diminution of intensity of colour without alteration in the form of the markings; 2, substitution of scales of a different colour, scattered or in groups; 3, imperfection in the development of scales or their pigment. Mr. Tutt showed a series of insects collected at Cannes in March, and remarkable for their early emergence. Dr. Dixey read a paper on "Mimetic Attraction," in which he dealt with the steps by which a wing-pattern, as in South American Pierinæ, could be modified in various directions so as to secure a mimetic result, and with the theories of mimicry put forward by Bates and Fritz Müller. Mr. Blandford also exhibited and discussed series of homœochromatic and mimetic Neotropical species of butterflies, chiefly of Heliconiidæ and Heliconioid Danaidæ. The discussion was continued by Prof. Poulton, who showed similar groups of several genera, remarkable as having been collected and sent to England as examples of a single species, and by the President, and it was ultimately adjourned to June 2nd.

South London Entomological and Natural History Society.—*April 22nd*, 1897.—R. Adkin, Esq., F.E.S., President, in the chair. Mr. Malcolm Burr, Bellagio, East Grinstead, Sussex, was elected a member. Mr. Waters exhibited a number of the "casts" of both the owl and the rook. These *rejectamenta* were examined, and the former contained bones and starlings' skulls, &c., while the latter contained corn-husks and beetles' wings mainly. Mr. Barrett, the only known

Scottish specimen of *Colias hyale*, captured in Dumbartonshire by Mr. Mallock. He also exhibited a var. of *Crymodes exulis*, taken by Mr. Percy Bright in Unst, which form was at one time considered a distinct species and termed *Hadena maillardi*, together with the same species from Rannoch and Iceland. Mr. Auld, a varied series of *Cucullia chamomillæ* from Lewis. Mr. Robt. Adkin, a series of *Hybernia marginaria* (*progemmaria*), the progeny of a pair received from Mr. Hewett, of York. About sixty per cent. of the males were of the black form and followed the parents, while the whole of the females were dark. He also made remarks upon the scaling and pigmentation. Mr. Mera, a larva of *Callimorpha hera* which had fed all the winter, and was in its last stage.

May 13*th*.—Mr. R. South, F.E.S., Vice-President, in the chair. Mr. Stanley Edwards exhibited a small scorpion, which he had captured at Digne, in the south of France, together with a specimen of the field cricket, from the same locality. He also exhibited a pupa of *Charaxes jasius*, and stated that Dr. Chapman had sent him larvæ of this species from Cannes earlier in the year. Mr. Tutt made remarks upon the condition of vegetation and insect life as observed by Mr. Edwards and himself during a week's holiday at Easter in the south-east of France. The weather there was superb, but yet the vegetation was, at 1900 ft. above the sea, but little in advance of that in the south of England. With the development of insect life there was no comparison, for in one day he had seen no less than fifty-two species of Lepidoptera. In the corner of one field were to be seen all our three Melitæas flying together. Mr. Lucas exhibited a mature and two immature specimens of *Leucophæa surinamensis* = *indica*, an Indian species of cockroach, taken in the forcing pits at Kew Gardens. Mr. Montgomery, young larvæ of *Apamea ophiogramma* in the stems of the ribbon-grass, and contributed notes on its habit of leaving its old burrow and selecting a new stem. Mr. South, a series of *Amphidasys strataria* (*prodromaria*), and remarked on their small size, while the larvæ had been unusually large. Mr. Auld, a varied series of *Boarmia cinctaria* taken this year in the New Forest. Mr. H. Moore, specimens of the rare insect *Pseudopontia paradoxa*, with drawings showing its anomalous venation, its bifid scales, and the isolated position of each scale on the wing-membrane. He contributed notes on the species, which he said had come from Mombasa, East Africa, and about the position of which there was the widest divergence of opinion; some authorities placed it in the Rhopalocera, some in the Geometers, and some among the Bombyces. Mr. Turner, on behalf of Mr. Clarke, of Reading, specimens of *Tephrosia crepuscularia* taken in the wood which Mrs. Bazett had said did not produce the species. Mr. Tutt read a paper, sent by Prof. Grote, M.A., entitled "Autumnal Notes from the Butterfly Camp by the Shores of Lake Erie."—Hy. J. Turner, *Hon. Report Sec.*

Cambridge Entomological and Natural History Society.—*April* 30*th*, 1897. The President in the chair. Dr. Sharp called attention to a peculiar structure which he detected some years ago in *Chrysiridia madagascarensis* better known as *Urania rhipheus*. On each side of the second abdominal segment there is an ear-like opening, usually much concealed by overlapping scales, giving entrance to a chamber which extends to the middle line and forwards towards the base of the abdomen, so that a considerable space in the anterior and upper part of the abdomen is occupied by the chamber. At the anterior external part of this depression or chamber there is a second vesicle-like chamber, formed by a delicate membrane. He considered this structure to be some kind of sense organ, and thought it must be of great importance to the creature, as it occupies a large area of the abdominal region. It is independent of sex, and apparently occurs in all the members of the families Uraniidæ and Epiplemidæ. M. Oberthür had kindly supplied him liberally with dried specimens for the examination of this organ, but fresh individuals, or some well preserved in spirit, are necessary before any of the finer details of the structure can be ascertained.—L. DONCASTER, *Hon. Sec.*

THE CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY held a successful exhibition on April 27th, at the London Institution, Finsbury Circus. Besides the members of the Society, many leading entomologists kindly contributed exhibits. Mr. J. A. Clark sent full representation of all our known British butterflies, amongst which were a long series of male and female *Chrysophanus dispar*, hermaphrodite specimens of *Dryas paphia*, *Plebeius ægon*, and *Polyommatus icarus*, and black vars. of *Limenitis sibylla*. Aberrations in Mr. C. Nicholson's Vanessids included *Pyrameis atalanta* with partial bleaching of red band on right wing, *P. cardui* with an additional white spot on fore wings, and *Aglaia urticæ* approaching var. *ichnusa*. Mr. A. W. Dennis, a xanthic *Epinephele ianira*, *Pararge egeria* female with male coloration, *Pyrameis cardui* much suffused with black, *Argynnis adippe* with median black band on all wings, *Cupido minima* under sides with spots obsolete, *Spilosoma lubricipeda* with central fascia on all wings, *S. menthastri* with spots much enlarged. Mr. Robt. Adkin, well-known British species of "Clear-wings," series of *Endromis versicolor*, *Lasiocampa quercifolia* and *L. ilicifolia*, &c.; *Camptogramma bilineata*, black forms from Kerry, banded from Shetland; banded *Thera juniperata* from Orkney; black *Amphidasys betularia* from Yorkshire; vars. of *Boarmia repandata* and *Abraxas grossulariata*. Mr. J. W. Tutt's Zygænids included *Zygæna hippocrepidis*, a species usually confounded with *Z. filipendulæ*. Amongst his Geometers were a series of aberrations of *Cidaria immanata* from Lochgoilhead, and a hybrid between *Amphidasys strataria* and *A. betularia*. Mr. W. M. Christy, *Zygæna filipendulæ* and *Z. trifolii*, with vars.; *Macroglossa bombyliformis* with scales all over the wings, only found prior to flight of imago; and *Nyssia lapponaria* with *N. zonaria* and continental relatives for comparison. Mr. C. G. Barrett, British and European Psychids, with their curious larva-cases; long and variable series of *Agrotis cursoria* and *A. tritici*; Leucaniidæ, with *Leucania favicolor*, n. sp., lately described by himself, and vars. of female spotted, the latter belonging to Mr. G. F. Mathew; and a moth from Unst, Shetland, agreeing with *Hadena maillardi* (St. Cat.), placed on the table as a form of *Crymodes exulis*, but if of specific rank would be an addition to the British list. Typical *C. exulis* and one intermediate form belonging to Mr. Percy M. Bright were also exhibited. Mr. F. J. Hanbury, Noctuæ, *Noctua festiva* var. *conflua* being largely represented, and the

Xanthiæ and Catocalæ were much admired. Mr. L. B. Prout, bred series of *Coremia ferrugata* and *C. unidentaria*, to illustrate the influence of heredity. Mr. G. Elisha, twenty drawers of Micro-Lepidoptera, of the greatest beauty as to freshness of moths and regularity of setting. Mr. D. C. Bate, larvæ of *Orgyia gonostigma*. Mr. J. Riches, larvæ of *Apamea ophiogramma* on their food-plant, variegated ribbon-grass. Mr. C. Nicholson, preserved larva of *Lasiocampa quercifolia*, showing the "lappets." Mr. S. Edwards, a valuable and immense collection of Papilioninæ from all regions. Exotic Lepidoptera were exhibited by Messrs. J. A. Clark (Morphinæ, *Atlas*, *Cecropia*, *Thysania agrippina*, &c.), A. Bacot (South African), E. M. Dudd (American), and Dr. J. S. Sequeira (Indian). The subject of "mimicry," or the assumption by persecuted species of similar or nearly similar coloration to that of species protected by scents, colours, or presumed nauseousness of flavour, from birds and animals, was well illustrated by Messrs. Watkins and Doncaster and O. E. Janson and Son. Mr. H. Heasler, Coleoptera, being the material for his "London List," which includes *Molorchus minor*, *Oodes helopioides*, *Aphodius lividus*, *Rhinonchus bruchoides*. Messrs. O. E. Janson and Son, case of Phasmidæ or stick-insects, twig-like when quiescent, a further development of the "protective mimicry" principle. Mr. W. J. Ashdown, Odonata, showing that *Anax imperator* and *Libellula quadrimaculata* var. *prænubila* can be captured in Surrey. Mr. J. A. Clark, nests of *Vespa britannica* from Forres, on fir, beech, and heather, and from New Forest on ivy and yew. Dr. J. S. Sequeira, insect products, such as silk, wax, honey, cochineal, shellac, &c. Mr. R. M. Wattson's "Life in a Pond" exhibited dragonfly nymphs, water-beetles, water-scorpions, and other inhabitants of our ponds and pools. Mr. D. C. Bate, a "cat's-eye" electric lamp for sugaring. There were also many exhibits in other branches of natural history. Mr. Fred. Enock, in his happiest style, gave a lecture on "The British Trap-door Spider." Lord Walsingham, an honorary member of the Society, visited the soirée early, and addressed the members on the value and pleasure of a study of nature. A programme of music was delightfully rendered in the course of the evening, and light refreshments were served to all visitors.—H. W. Waugh.

Nonpareil Entomological and Natural History Society. — *May 6th*, 1897.—Mr. Gurney exhibited a dwarf specimen of *Asphalia ridens*, which, besides being peculiarly marked, had been in the pupa since 1895 and just emerged. Mr. Norman, a box of finely preserved larvæ of *Saturnia carpini*, *Sphinx ligustri*, *Chærocampa porcellus*, *Dasychira fascelina*, *Calocampa vetusta*, *Zeuzera æsculi*, &c.; he also showed four bred specimens of *Deilephila euphorbiæ*. Mr. Lusby, fine full-grown larvæ of *Arctia villica*, from Willesden, and Mr. Harper, larvæ of *Arctia caia*. Four male and two female specimens of *Lycæna argiolus*, from Wood Street (taken May 2nd), were also shown by Mr. Lusby. Mr. Samson exhibited *Plusia orichalcea* from St. Margaret's Bay, *P. chrysitis* and *P. pulchrina* from Winchester, male *Lophopteryx carmelita* from West Wickham, and other insects. Messrs. Pickett and West also exhibited various species of Lepidoptera. — F. A. Newbery, *Reporting Secretary*.

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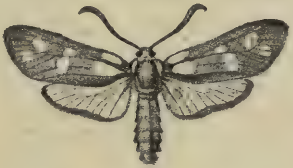
ZYGÆNA FILIPENDULÆ var. *HIPPOCREPIDIS.*



When I visited a certain meadow on the Hertfordshire border of Middlesex on June 12th last, *Ino statices* was worn and seemed to be almost over for the season. *Zygæna trifolii*, however, was still about and in fine condition, but much less common than when I had the pleasure of seeing it in that particular field on a previous occasion. There were no *Z. filipendulæ* with it this year, and there were no varieties worth mentioning. About a quarter of a mile distant from the *Z. trifolii* field *Z. filipendulæ* was flying in numbers, and there were also a great many cocoons and a few larvæ of the species about, the latter preparing to enter the pupal stage of their existence. It was curious to note that the cocoons were not only attached to the stems of grass and other plants, but also to posts, and even iron hurdles, which under the brilliant sunshine were really hot.

The question having been raised as to whether or not these June Zygænas of the six spot persuasion are specifically distinct from *Z. filipendulæ* which appears in July and August on chalk downs, &c., I took the opportunity of collecting a goodly sample of the imagines then on the wing, as well as a liberal supply of the cocoons. These latter, I may remark, were not always affixed to the higher parts of the stem, but were found in all kinds of positions from quite near the ground, and well concealed among herbage, to close up to the summit of the stalk or stem, where they were of course fully exposed. As a matter of fact, some of the latter were evidently indiscreetly placed, as they offered a tempting morsel to epicures in that particular line of dainty fare, and the contents of the cocoons had been duly annexed. The cocoons placed nearer the ground, or at least among the herbage, were, so far as I could ascertain, left intact.

It is of course well known that the specimens of *Z. filipendulæ* occurring in June have been referred to *hippocrepidis* by Stephens, and there is no reason why the form that Stephens described under that name should not retain the distinctive cognomen, as it is not likely to be confused with *Z. hippocrepidis*, Hübn. Stephens's name cannot, however, apply to the June flight of the insect as a whole, because all the individuals are not of the form which he described as *hippocrepidis;* many of them on the contrary are unmistakable typical *filipendulæ*. Again, but this does not present any objection to using the name, var. *hippocrepidis* occurs among the individuals of *filipendulæ* emerging in July and August, and I have examples taken or bred in those months both at Ventnor and Folkestone.

As already mentioned, I obtained larvæ with the pupæ and imagines. I think there is no question about what species the larvæ belong to,—yellow, with two interrupted black dorsal stripes and a narrower and more interrupted black stripe on each side above the spiracles. Perhaps it would be more correct to describe the black markings as longitudinal series of spots.

The imagines are emerging from pupæ at the rate of from four to twelve per day, and in some of the cocoons the larvæ have not yet pupated, so that it is quite likely that July will be well in before the last of the moths appears. Turning to my notes, I find that in 1887 I brought some larvæ from Ventnor on June 21st, and the imagines, including var. *hippocrepidis*, emerged in July. In 1885, at Folkestone, I found *Z. filipendulæ* exceedingly abundant in the last week of August, and on that occasion I secured one of the most variable series I have been able to obtain so far, and among the specimens there were examples of *hippocrepidis*. So in the matter of dates we have June, July, and August for the variety in question, and we see that typical *Z. filipendulæ* is on the wing during the same months.

With regard to the relationship of *Z. filipendulæ* and *Z. trifolii*, I am of opinion that it is an exceedingly close one. In fact, I am inclined to suppose that the former may be a development of the latter. In other years I have seen the two species flying together, but I have never seen *filipendulæ* paired with *trifolii*. I am quite open to admit that such pairings do take place, although I am hardly disposed to accept var. *hippocrepidis* as the result.

When the whole of the imagines have emerged from the pupæ I collected and are available for study, I may have some further remarks to make. In the meantime I would call attention to the figure of var. *hippocrepidis* given above, and suggest that attention should be turned to *Z. filipendulæ* during the season, and this form noted wherever detected.

RICHARD SOUTH.

100, Ritherdon Road, Upper Tooting, S.W.
June 21st.

The following description of *Zygæna* (*Anthrocera*) *hippocrepidis*, Steph., and remarks thereon are extracted from Stephens's Ill. Brit. Entom. Haust. i. p. 109 (1828):—

"Alis anticis nigro-cyaneis, maculis sex rubris, subtus omnino confluentibus, posticis rubris margine sinuato viridi-cyaneo, abdomine immaculato (Exp. alar. 1 unc. 1–7 lin.).

"This varies in size like *A. filipendulæ*, which it greatly resembles; but the border of the posterior wings is considerably more distinct than in that insect, and undulated internally: the sixth spot on the anterior wings (the one towards the anal angle) is generally small, with a coloured nervure passing through it; the under surface of the anterior wings with the disc entirely red, and the maculations not defined. Above, the anterior wings are blue-black, with six red spots, disposed as in *A. filipendulæ*, and the posterior wings red, with an undulated greenish-blue margin; the abdomen immaculate.

"Var. β. The anterior wings above of a pale yellowish-green, with six pale lemon-yellow spots; the posterior wings of the latter colour, with a bluish-green border. Like *A. filipendulæ* this varies considerably from the spots being more or less confluent, or obliterated.

"Caterpillar greenish, with a broad yellowish stripe on each side, and a row of black spots; the head black varied with white: the anterior legs brown, the following yellow, the rest black: it feeds on the wild liquorice (*Astragalus glycyphyllus*). The chrysalis is dusky-brown, with the abdomen greenish spotted with black.*

"I have captured this insect in the vicinity of London; first in a field near Coombe-wood on the 20th of June, 1810, and subsequently near Darenth-wood: of var. β, I have seen three specimens only, which were reared from larvæ taken in the latter habitat, where the wild liquorice abounds."

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* These descriptions apply to the larva and pupæ of *hippocrepidis*, Hübn., not to the preparatory stages of *hippocrepidis*, Steph.

SOME THOUGHTS SUGGESTED BY MR. HARCOURT-BATH'S PAPER. (*Ante*, pp. 157–161).

By J. W. Tutt, F.E.S.

I have tried to understand the various papers by Mr. Harcourt-Bath that have been published in the 'Entomologist' during the past twelve months, and have signally failed. I do not wish to suggest this is Mr. Bath's fault, and I am inclined to think it is rather my misfortune than my fault. There must be, however, many entomologists in the same unfortunate position as myself, and if this communication only serves to draw from Mr. Bath an explanation more suitable to our meaner intellects it will have fulfilled its purpose.

Mr. Bath (*ante*, p. 158) makes the statement that "the geographical and vertical distribution of the Rhopalocera, in a very great degree, is so intimately connected with the distribution of their pabula that it is reasonable to suppose they have closely followed the various migrations of the flora upon which they are so dependent both antecedent to and after the termination of the glacial period." To illustrate this he goes on:—"As the genus *Erebia* is the most extensive and typical group among the alpine butterflies, it will serve to illustrate with a certain degree of accuracy the facts relating to the whole." Now the pabula of the larvæ of this genus is grass, and the species of *Erebia* are not very particular as to the species of grass. Grass, in great variety, extends from pole to pole. It is necessary therefore, so far as I understand Mr. Bath, to get a knowledge of the distribution of grass to obtain a knowledge of the distribution of the genus *Erebia*. Grass is found almost everywhere; the species of *Erebia* are often extremely localised. Their distribution is, of all genera, entirely independent of the general distribution of their food-plant, and most of the various species are often confined to a certain small portion of a valley in which the flora is practically identical over thousands of acres.

Having surveyed in the most cursory manner the distribution of the genus in Europe, Asia, and North America, he concludes that the species are segregated mainly in the Pyrenees, Alps of Europe, Caucasus, Thian Shan, Altai, and Amur. This is, of course, such a well-known fact that it appeared to be hardly worth mentioning. He also states that the species are very scarce south of the mountain chains, and that this furnishes us with an approximate estimate of the extreme distance south to which the alpine fauna was driven during the climax of the glacial period in the Palæarctic Region.

Mr. Bath (*ante*, p. 159) says that, "In preglacial times these butterflies were probably found in company with their pabula throughout the whole of the northern portions of the Europasian area, their range extending to well within the Arctic Circle. Upon the advance of the ice-cap they retreated south until they reached the six great chains of mountains which I have already described. Many of the species were probably unable to surmount the barriers which they furnished, and consequently perished, whilst the majority perhaps forced their way through them by means of transverse passes and valleys, and survived in the sheltered and more hospitable areas which they would provide immediately to the south." Now this is a very pretty theory, but what about the geological and other facts assumed?

It occurs to me to ask Mr. Bath whether he thinks that any scientific entomologist believes that the genus *Erebia*, as such, existed in preglacial times? As I understand Mr. Bath's references, it would appear that his references to preglacial times are especially directed to those observations which geologists have published relating to the subtropical fauna and flora which are known to have existed in the extreme north in the Miocene period, and he assumes, so far as I understand his writing, that *Erebia* and the *Erebia* species lived in the North Polar Region at that time. If so, I would suggest that *Erebia* would be, under these conditions, a subtropical genus, and, being "driven southwards by the ice-cap," would, if it found subtropical quarters south of the six great mountain chains, by the species "finding their way through passes," to suit it, prefer remaining in such quarters to attempting a return which led it out of subtropical quarters, in order, apparently, to see how far it could get up mountains, or how far it could get back to polar conditions from the "remainder of Europe south of the mountain chains," which during the glacial period were "capable of affording a safe refuge to the alpine butterflies" during the dreadful time Mr. Bath says they experienced at the time of the glacial epoch.

One is constrained to ask, too, whether it would not have been more to the point if Mr. Bath had given us, on the authority of some capable geologist, the condition of the great mountain chains that extend from the Pyrenees to Kamtschatka during the periods comprised in, and that directly antecedent to, the glacial epoch; so that we might obtain some idea of the condition of the mountains the butterflies are said to have crossed? Sir John Lubbock tells us that in the European part of the range as much solid matter has been removed by denudation as now remains. Geikie tells us that at the time of the glacial epoch the whole of North Germany and the part of Europe in that latitude was covered with glacial loess. It is well known that the ice-flow from the Northern Alps set along Central Europe to the east, and one would like to know where those places were to be found "which we might fairly assume with a certain degree of safety might be found to the north of the Alps, the Pyrenees, and the Carpathians," and "where a few species even survived."

Let us summarize the well-known facts:—(1) ice to the north of Germany; (2) mountains existing where the Alps are now; (3) glaciers flowing north into France, Germany, &c. And then we are asked to assume certain spots between the Alps and Baltic Sea where butterflies might survive, whilst those that did not survive pushed through transverse passes across the Alps—and such Alps and such passes! Then, as I understand it, there was a journey back after it was all over. This is picturesque, but—is it possible? For some years I have been almost as much interested in geology as entomology, but Mr. Bath's geology is beyond me.

Mr. Bath does not think "that the climatal conditions were so severe as supposed by Hoffmann." This is a matter for the geologists, and if they say it was—well, to say the least—as specialists, I should take their opinion before that of Mr. Bath. On the premises pointed out, Mr. Bath concludes that "the great majority of the alpine forms of butterflies found a sanctuary during the climax of the glacial period to the immediate south of the three great chains of mountains on either continent."

There is another phrase which I cannot understand. Mr. Bath says he thinks Hoffmann "is incorrect in imagining that the post-glacial alpine forms were not directly derived from the south." Now Mr. Bath has been at great pains to show in his paper that Hoffmann is wrong in supposing that the insects during the glacial epoch did not go into the warmer parts of Africa and Asia. This remark therefore means that Mr. Bath believes that this fauna was directly derived from the south, and "the south" as understood by Mr. Bath can only mean the country between the Pyrenees, Alps, &c., and the Mediterranean, so far as Europe is concerned, for he rules Africa out, not believing that even "a few went into Africa" and returned when the climate became warmer.

If our authorities on the geological conditions of Europe during the glacial epoch are correct, we have to deal with the following facts:—(1) Ice as far south as the Baltic Sea, giving off streams that flowed eastwards through Central Europe, and deposited the famous loess deposits of Germany. (2) Glaciers on the north face of the Alps, discharging also into the plains of Central Europe, the water-flow being east. As the whole of this central area was flooded during the Miocene period, one finds some difficulty in believing that any Lepidoptera existed north of the Alps, and hence it follows that Hoffmann's suggestion is probably the correct one. The distribution of the Lepidoptera previous to the glacial epoch is the merest guesswork.

That any of our present species of butterflies existed before the glacial epoch is very problematical—that the genus *Erebia* existed as such, I think no one who is both an entomologist and geologist would admit. It is probable that there was at the period of the land-connection between North Europe, Asia, and America some ancestral and widely distributed form which was subjected to vicissitudes of environment through the vast periods of time represented by the glacial epoch, and which, being of a plastic form, split up under the stress of environmental conditions into what we know as the various species of *Erebia*. And if we turn to facts as apart from mere speculation, *i.e.* to the facts offered by the study of the animals themselves, one is driven irresistibly to the conclusion that the genus *Erebia* as it at present exists is one of the most modern of all those inhabiting the Palæarctic and Nearctic Areas. Its species even now are not at all clearly defined. They are even now in some instances evidently in a state of evolution. Our best students of the butterflies of these regions own the fact, and my own studies of the alpine fauna are leading me irresistibly to the conclusion that a very large percentage of the alpine species by no means exhibit archáic types, but, on the other hand, exhibit the most recently modified of the species belonging to persistent genera which are spread over a vast area of land as measured by latitude and longitude, and whose larvæ feed on plants of very general distribution, not only as to latitude and longitude, but also as to altitude.

I am quite aware that destructive criticism is easy, and that it is more difficult to propound a satisfactory explanation. These critical notes have already run to considerable length, but I am quite open on the geological evidence to show that previous to the glacial epoch the distribution of plants (and therefore probably of insects) was a much simpler matter than at present. The climatic conditions, as shown by the Cretaceous and later forests, were comparatively uniform over the earth's surface, the plants inhabiting them were similar, the species (both of plants and insects) were few; that these archaic forms were the ancestors of our present fauna is very certain, but that they had developed any of the existing forms at any time preceding the glacial epoch is very improbable. Perhaps, if it appears necessary, our Editor will allow me to recur to the matter later.

NOTE ON SOME ORTHOPTERA FROM THE PERSIAN GULF.

By Malcolm Burr, F.E.S.

Mr. R. W. Lloyd has very kindly placed at my disposal a few Orthoptera, collected by Mr. J. H. Hiles at Bussorah. On the whole the species are what one would expect to find in that part of the world, though very little collecting, if any, has been done there. They are chiefly European species, but there is one cockroach that was previously known from Bombay; but with many cockroaches and some earwigs locality is of no account, for they spread with trade all over the world to such an extent that it is sometimes doubtful whence they originally came. It is interesting to find the Egyptian *Tryxalis pharaonis*, Klug, in the Persian Gulf; it is not found in Europe.

The collection includes seventeen specimens and ten species, of which there are two Blattodea, two Mantodea, four Acridiodea, one of the Locustodea, and one of the Gryllodea. There were also a few aquatic Rhynchota, which Mr. G. W. Kirkaldy tells me are *Ranatra vicina*, Sign., and *Belostoma niloticum*, Stål, which are species which one would expect from the neighbourhood. The following is an account of the Orthoptera:—

Heterogamia ægyptiaca, Linn. One male. Occurs also in Southern Europe from Spain to Greece, in the north of Africa, Asia Minor, Syria, Rhodes, and the Amoor district (Brunner).

Periplaneta monochroma, Walk. One male. Apparently allied to *P. pallipalpis*, Serv. Also from Bombay (Brit. Mus. Coll.).

Mantis religiosa, Linn. One mutilated female. Occurs also in Southern and Central Europe, in Asia from Hindustan to Java, and in Africa to Zanzibar (Brunner); also in the Canary Islands, China, Cyprus, Corea, Afghanistan, Silhet, Behar, and the East Indies (Brit. Mus. Coll.).

Empusa pennicornis, Pall. One specimen. Also from South Russia (Burm. Kittary), Sarepta on the Volga (Eversm.), and Turkey (Burm.).

Tryxalis pharaonis, Klug. One female. Also from Egypt (Klug).

Epacromia tamulus (?), Fabr. = *tricoloripes*, Burm. One female. Widely distributed over Eastern Asia and Australia. It is with a little hesitation that I refer it to this species, but the specimen seems to be hardly different from individuals from Mindoro in my collection.

Opomala cylindrica, Marschall. Two females. Also from Minorca (Bol.), Sicily, Greece (Brunner), Beyrout (Coll. mea).

Acridium ægyptium, Linn. Two females, showing great difference in size. Length of body, 46 mm. and 66 mm.; length of elytra, 51 mm. and 67·5 mm.; length of post-femora, 26 mm. and 33 mm.; expanse of elytra, 110 mm. and 141 mm. This species is the largest of the European Acridiodea; it is common in Southern Europe, but does not commit any serious damage in spite of its size. It occurs in the Kirghis steppes, but Brunner remarks, "Further east into Asia it is as little known to me as it is in Central or South Africa." It is occasionally imported into this country in vegetables.

Decticus albifrons, Fabr. Two females. This fine species is common in the Mediterranean region and in Asia Minor. It extends as far as the Ural Mountains (Eversm.). It has once been taken in England, at Ramsgate, but probably escaped from a passing vessel.

Gryllotalpa gryllotalpa, Linn. One male and four females. Common in Europe, west of Asia and North Africa. The allied *G. unispinosa*, Sauss., is found in Turkestan, and *G. africana*, P.-B., is found throughout Africa, except the north coast, Madagascar, Southern Asia, China, Java, Sumatra, and Borneo (Sauss.). I have ventured to restore Linnæus's specific name. If Latreille adopts the specific name for the generic, it is no reason that the law of priority should be infringed, and Linnæus's name must stand. It is unfortunate that the two names should thus be the same, but the only way in which it can be avoided is to change the generic name; but it has been in such general use for so many years that the confusion that would follow would be worse than the evil of having the generic and specific name alike, which at least has the advantage of fixing the type of the genus.

Bellagio, East Grinstead, May 26th, 1897.

AN ESSAY ON THE CLASSIFICATION OF INSECTS.*

By John B. Smith, Sc.D.

Of late years the phylogeny of insects has attracted considerable attention from students, and much light has been thrown upon the subject by the researches made. One of the most notable facts has been the breaking away from the old Linnean orders, and the substitution of a number of more compact assemblages for some of the almost indefinable aggregations found in the old classification. New characters have been sought, not only in structures visible externally, but even in internal anatomical peculiarities. The subject is a very interesting one, which the teacher is of necessity compelled to study more or less, and which I was led to examine more particularly when the question recently came up as to the adoption of some system in a general work on 'Economic Entomology,' which has since been published. The conclusions reached by myself, while in general they agree with the latest published results, have been arrived at by a somewhat different method, and my ideas concerning the development of the orders are somewhat unlike those heretofore accepted. I have tried to adhere logically to a scheme of easy development, and have made use of some characters not heretofore particularly noted. Leaving aside for the present all questions as to the origin of the class "Insecta," and as to its ancestors, I start from a developed hexapod—an archetypal Thysanuran with six, jointed legs; without wings; with or without abdominal appendages other than functional legs; with no eyes or with ocelli only; with a head not greatly differing in size or form from the body segments; with the thoracic segments equally developed and not greatly differing except in appendages from those of the abdomen. This creature lived in moist places, perhaps partially in the water, and had the tracheal system feebly or not at all developed; absorbing oxygen chiefly through the skin and tending, perhaps, as much in the direction of an aquatic as a terrestrial life. It had no distinct metamorphosis, was oviparous, bisexed, changing little in appearance from the time it emerged from the egg until it was adult and capable of reproduction. The mouth structures were generalized, feebly developed; but with at least three, and possibly four, pairs of composite structures corresponding to mandibles, maxillæ and labium of our existing insects. The possible fourth pair may have been an endo-labium and, perhaps, the labrum with its attached epipharynx may have required a fifth pair of structures. Most essential of all was an inherent power of variation and adaptation, and probably, as with some of our present Thysanurans, reproduction was rapid and enormous numbers existed. The first important differentiation occurred in the mouth structure long before wings became developed, tending on the one hand to a perfection of all or most of the parts, or to a mandibulate type; on the other to a loss of certain of the structures, accompanied by a different development of the others, forming a haustellate type. In this latter branch the mandibles were never developed, the maxillary structures became elongated, separated into their parallel parts, and the labium became obsolete as a functional organ. Just how many intervening orders existed between Thysanura emandibulata and the best development of the haustellate structures it is impossible to say; but the only one in existence at the present time is Thysanoptera, also called Physopoda, otherwise Thrips.

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* 'Science,' n. s., vol. v. pp. 671–677 (April 30th, 1897).

This order I consider a distinct one on the same branch from which arose the Hemiptera, but forming merely a short spur and retaining characters which were soon lost in the main and more vigorous branch. It is a survival which has lost the power of further development, and can do no more than merely maintain itself. The main branch formed the Hemiptera, or, as I prefer to call them, the Rhyngota of to-day; the mandibulate parts being completely lost, the labium losing all external appendages, and the maxillæ forming the jointed beak with its enclosed lancets.

The Thysanoptera and Rhyngota of all the existing orders are the only ones that do not have functional mandibles in some stage of their development. They are haustellate from their birth, and the character of the mouth parts never changes. In all the other orders, either larvæ or adults, or both, are mandibulate. I am aware that there are seeming exceptions in several orders, notably the Diptera; but it will hardly be disputed that this order is of a mandibulate stock, and many larvæ have the parts well developed.

It results from the views just stated that the Thysanoptera and Rhyngota are a division equal in value to all the other, or mandibulate, orders combined. They have their origin from the common stock, but were always haustellate or emandibulate in all stages, forming the first and lower of my main divisions. With the development of this branch, after its distinctive feature became established, I have nothing to do at present. It seemed adapted for variation in special lines only, and, as the method of feeding was practically fixed from the beginning, there is a remarkable similarity in mouth parts throughout.

The *mandibulata* possessed much greater powers of variation, and a mouth structure in which all the parts were developed and capable of modification, containing possibilities of much greater range in obtaining food. They lived therefore under all sorts of conditions, in all sorts of media, and all kinds of modification were produced; some of them short-lived, adapted only to surroundings then existing; others with greater possibilities, that exist to the present time.

The first mandibulate insect had the thoracic segments similarly developed, all of about the same size, and each of them free; but the advent of wings gave opportunity for radical divisions. I have no desire to go into details here more than necessary to explain my views of classification, hence will not pretend to account for the origin or development of wings. They did appear, however, and independently at several different points. In all cases the wings were net-veined or neuropterous in type, a peculiarity which is explicable if the venation be considered of a tracheal origin. With the appearance of wings many divergences in habit were made possible, and new types began to appear. Three main lines branched almost simultaneously from the common stock, each of them fairly well marked from the beginning, retaining its peculiarities and even intensifying them in all future subdivisions to the present time. In the first of these the prothorax, bearing no wings, became separated from the other rings and movable, or in a sense dominant. In both the others it tended to a reduction in size or to become agglutinated with or united to the others. In a general way it may be said that the series in which the prothorax is free is lower in the scale of development, as retaining a more primitive type. The orders belonging to this subdivision or branch are the Dermoptera, Coleoptera, Plecoptera, Platyptera, and Orthoptera.

[The orders placed in the first division are then discussed in detail, and remarks made on phylogeny.]

The second branch from the Thysanuran stem started with all the thoracic segments nearly equally developed. While the prothorax was of good size and in the lowest forms quite free, yet the tendency was from the very start to unite it at its base to the other thoracic segments. In this series it is always fairly well developed, sometimes even very long; but it is always closely joined to the mesothorax at the base, and is not movable, while the tendency is for the head to become free from it, and at all events not to be inserted into the thoracic segment. While we do not have anywhere in this series a distinct neck, yet on the other hand there is nowhere a retraction of the head into the prothorax. In this series both pairs of wings are similarly developed, both as to size and as to general character, while the secondaries, though frequently covered by the primaries, are never folded beneath them in any way. The primaries are always functional.

The lowest in this series, and almost the simplest in general structure, are the Isoptera, where all the thoracic segments are well developed, and the prothorax is scarcely dominant, though larger and almost free from the others. The wings are very much alike, the secondaries only a little larger than the primaries, and both are laid flat upon the abdomen. The mouth structures are almost identical with those of the earwigs and some of the Orthoptera. I believe the members of this order are amongst the most primitive of all the terrestrial winged insects now existing, and among the most ancient, though remarkably specialized in certain directions at the present time. Though at first glance it would seem as if these insects should belong to the series in which the prothorax is free, yet the character of the wing structure forbids this association, and makes the Isoptera a natural stem from which were derived the Mallophaga, Corrodentia, and Neuroptera.

[The phylogeny of the orders included in the second division is then considered.]

The third series, in which the prothorax becomes much reduced in size and firmly articulated to the mesothorax, has the body parts as a whole much more closely jointed and globular. The tendency is to bring the origin of the legs close together, and to the loss of the sternum as a distinct part or sclerite between the coxæ. The mesothorax becomes dominant and best developed, bearing also the chief organs of flight. As a whole, subject to many exceptions, the tendency is to the development of the primaries, which are never reduced to mere wing-covers and never lose function. The tendency seems to be rather to a decrease in the size of the secondaries, as in Hymenoptera, and to their total loss, as in the Diptera. There is, however, a great deal of variation in this respect, and the most that can be justly said is that in this series the secondaries never become the only, or primary, organs of flight. Another point of very great importance is that here the head is nearly always more or less free or well separated, tending to the formation of a distinct neck; while there is never any insertion of the head into the prothorax. This fact will become very striking when the orders that are placed here are compared with those in the other section, and this difference in the articulation of the head has never been, in my opinion, sufficiently emphasized in our classification of the orders. It is closely correlated with the decrease, in size, of the prothorax.

In mouth structure the tendency is all in the direction of galear development in the maxilla, while the lacinia becomes constantly less important. In the Diptera, in which this series finds its highest development, the galea predominate over all other mouth structures. In the Hymenoptera the galea is always most highly developed, and particularly so in the bees, the most completely differentiated of all in the order. In the Lepidoptera the galea alone is developed into a functional organ, and in those net-veined orders in which the mouth parts are not rudimentary merely the galea is at least as well developed as and never subordinated to the lacinia. The orders which I placed in this series are Odonata, Ephemerida, Trichoptera, Mecoptera, Hymenoptera, Siphonoptera, and Diptera.

[Here follow remarks on the phylogeny of the orders in the third division.]

I am quite aware that objections may be urged to this scheme, and that it is imperfect in some respects, but so also are all the others that have been proposed; and I believe, as I look at the matter, that my plan answers more of the objections than any other that I have seen. Nothing known to me contradicts it more vitally than any other that has been proposed.

I have accorded very little place to the character of the metamorphosis, because there is no hard and fast line between complete and incomplete; but the closer comparative study of early stages will unquestionably help out our future classification. I have not made use of any one character as the basis of my scheme of division, because I do not think nature works in that way; and, finally, I have used adult stages only, because I see in the adult ready to reproduce, the species. It is the culmination of individual growth, and until it is ready to reproduce it is incomplete, subject to change, and not an expression of the point to which its development has attained.

NEW SPECIES OF SOUTH AMERICAN EUMOLPIDÆ.

By Martin Jacoby, F.E.S.

(Continued from p. 170.)

Chalcophana elongata, n. sp.

Elongate, narrowed posteriorly, black, above fulvous with metallic green gloss; head and thorax sparingly punctured, stained with fuscous; elytra strongly and closely semi-regularly punctured, the sides very acutely bi-costate, apical angles concave-emarginate. Length 4 lines.

Head sparingly, irregularly, but distinctly punctured, fulvous, the vertex with a more or less distinct greenish black spot; clypeus subquadrate, finely punctured; antennæ scarcely extending to the middle of the elytra, fuscous or black, the lower four joints fulvous, the third and the following four joints elongate, equal, the terminal ones shorter; thorax nearly twice as broad as long, the sides nearly straight, oblique, the angles tuberculiform, the disc with a more or less distinct lateral fovea, very sparingly and irregularly impressed with larger and smaller punctures, dark fulvous, the sides marked with piceous, ill-defined; scutellum fulvous; elytra reddish fulvous with metallic pale green gloss, very elongate, the apex of each concave-emarginate, the surface closely and very strongly punctured, the punctures near the suture more or less geminate and separated by raised longitudinal interspaces which assume the shape of strongly raised costæ at the sides, of which two below the shoulders are very highly raised and continued to the apex, the shoulders themselves are likewise strongly raised and prominent, and have another short costa below near the lateral margin; breast and abdomen black; legs fulvous; prosternum very deeply bilobed.

Hab.—Bolivia.

This is one of the most distinct species of the genus, which may be best compared with *C. quadricostata*, Jac. (Biolog. Cent. Amer.), on account of the emarginate elytral apex; the present insect is, however, very elongate, and has the entire under side black, while the legs and tarsi are fulvous. The two specimens contained in my collection are evidently females, and the other sex is probably devoid of the elytral costæ.

CHALCOPHANA VIRIDI-BASALIS, n. sp.

Elongate, pale fulvous; the antennæ, tibiæ, and tarsi black; thorax sparingly punctured; elytra strongly and closely punctate-striate, pale fulvous, gradually shading into metallic green at the base. Length 3–4 lines.

♂. Head rather strongly and closely punctured, dark fulvous; clypeus similarly sculptured; labrum flavous; antennæ extending beyond the middle of the elytra, black, robust, the third joint one half longer than the second one, but much shorter than the fourth joint; thorax twice as broad as long, the sides rounded, the angles tuberculate, the surface with larger and smaller punctures, sparingly and irregularly distributed; elytra strongly punctured near the base, the punctures gradually diminishing in size and arranged in closely approached rows, the basal portion and the suture metallic green, the rest of the surface pale fulvous, both colours gradually blending before the middle; under side and the femora pale fulvous; the tibiæ and tarsi nearly black.

♀. Larger; the elytra with two or three short costæ at the sides below the shoulders.

Hab.—Bolivia.

In this species, of which I possess six specimens, the metallic green colour of the elytra is confined to the base only, although not well separated from the pale fulvous portion. I am not acquainted with any similarly coloured *Chalcophana*, which on that account and the dark antennæ and tibiæ will not be difficult to distinguish.

CHALCOPHANA PUNCTATISSIMA, n. sp.

Obscure fulvous with metallic gloss; antennæ (the basal three joints excepted), the tibiæ, and tarsi black; thorax very sparingly punctured; elytra metallic green, extremely closely punctured, the lateral and apical margins narrowly fulvous. Length, 3½ lines.

♂. Head rather closely punctured, fulvous, with a purplish gloss, the middle with a short but deep groove, frontal tubercles strongly raised; clypeus nearly impunctate; antennæ black, the lower three or four joints fulvous; thorax scarcely twice as broad as long, the sides rather strongly rounded, the angles tuberculiform, the surface finely and very sparingly punctured, dark rufous with a strong purplish or greenish gloss; scutellum fulvous; elytra metallic green with a very slight depression below the base, the apical angle of each produced into a small tooth, the surface closely and finely punctured, especially so near the apex, the punctures near the suture below the middle arranged in more or less distinct double rows which are interrupted by some smooth longitudinal spaces, the extreme lateral and apical margins as well as the suture posteriorly rufous; under side and legs rufous; the greater portion of the tibiæ and the tarsi bluish black.

Hab.—Ecuador.

The very close and fine elytral punctuation distinguishes this species.

CHALCOPHANA ABDOMINALIS, n. sp.

♂. Fulvous; the antennæ (the basal two joints excepted), the apex of the tibiæ, the tarsi, and the abdomen black; thorax sparingly punctured; elytra metallic green, finely punctured in single rows, the base with a depression. ♀. Elytra olivaceous green, very finely punctured, the sides with two short costæ. Length 3½–4 lines.

Head with a few punctures and the usual central depression, fulvous, the apical joint of the palpi piceous; antennæ extending beyond the middle of the elytra, bluish black, the basal two joints and part of the third fulvous; thorax scarcely twice as broad as long, the sides moderately rounded, the angles but slightly prominent, the surface with a few fine scattered punctures; scutellum nearly black; elytra metallic green, with a rather distinct lateral depression below the base, finely punctured in single rather closely approached rows, which, below the middle, are here and there arranged in pairs; the breast and the femora fulvous; the lower two-thirds of the tibiæ, the tarsi, and the abdomen black.

Hab.—Bolivia.

In the colour of the abdomen this species agrees with *C. peruana*, Har., and *C. palumbina*, Erichs.; from the former it is distinguished by having only the basal two joints of the antennæ fulvous and by the colour of the tibiæ and the distinct elytral depression. Von Harold has apparently described the female only, and says nothing about the sexes in any of his descriptions, which is one of the most important points in this genus. The female of the present species is larger, but agrees in all essential points, except in the colour of the elytra, which are of a dull olivaceous tint (there is only one specimen of this sex before me, I am therefore unable to say whether this colour is constant), and are more finely punctured than in the male; an indistinct costa runs from the shoulder to about the middle of each elytron, but another strongly raised costa is placed at the side below the shoulder and is again followed by another more indistinct one near the lateral margin. The apex of the elytra is not produced in either sex.

(To be continued.)

NOTES AND OBSERVATIONS.

Temperature Experiments on Lepidoptera. — Among the specimens exhibited by Dr. Standfuss in the insect gallery at the Natural History Museum, South Kensington, are some remarkable aberrations of *Vanessa polychloros*, *V. urticæ*, *V. cardui*, *V. atalanta*, *V. io*, and *V. antiopa*. One especially beautiful example of *V. antiopa* has all the wings shot with blue; another specimen of the same species has abnormally large blue spots; in others there is considerable darkening of the yellow borders, more particularly on the fore wings; others again show modification in the width of border, in some this is exceptionally wide, and more or less completely obscures the ordinary blue spots; these last would appear to be referable to var. *hygiæa* (a figure of a modification of this form will be found Entom. xxii. pl. viii. fig. 4). In the aberration of *V. atalanta*, the chief features are absence of costal white spot and an increase in the size of two of the spots of outer marginal series above red band; there is also modification in the width and shape of the red band. Of *V. io* there are, among other curious forms, some interesting examples of the "blind-eyed" aberration *dyophthalmica*. In addition to the many highly instructive results of the artificial temperature treatment exhibited by Dr. Standfuss, there is a selection of results obtained by Mr. Merrifield, who, as is well known, has devoted much time to this line of scientific investigation. If anyone is still sceptical as to the effect of temperature in the coloration of Lepidoptera he should make a point of studying the series of *V. urticæ* and *V. levana*. Of the first-named species there are six examples which emerged from pupæ that had been iced and cooled, and six from pupæ that had been subjected to increased temperature. Five of the former show a general darkening of the black spots and a blackish suffusion of the secondaries, whilst the sixth has the ground colour deeper than usual and the yellow spots are absent. Of the six forced specimens, four have the three central black spots more or less effaced, and in the other two the outer margins are paler. Winter pupæ of *V. levana* subjected to the forcing process produced specimens like some of those resulting from summer pupæ which had been first cooled and subsequently forced. On the other hand, iced and cooled summer pupæ yielded forms which although larger in size are almost identical in coloration with those emerging under normal conditions from winter pupæ. We understand that this collection, which is still at the Museum, will only remain there for a short time longer.

Melanism and Climatic Conditions.—Referring to the paper on this subject by Mr. G. W. Smith (*ante*, p. 127), a contemporary thinks it is superficial and illogical, and adds:—"The author writes from the College, Winchester, and the paper might readily be supposed to emanate from a schoolboy who did not understand his subject. But why such a prominent place in 'The Entomologist'?" The author of the paper in question is not personally known to us, but if he be a schoolboy, as suggested by the captious critic from whose note we have quoted, his communication is at least free from disparaging remarks concerning those who hold views opposed to his own, and this is more than can always be said of the published writings of a schoolmaster. Further, we are of opinion that the paper is not illogical, and we have reason to believe that the author is fully acquainted with his subject. The "prominent place" query may be passed over as inconsequent.

Hybrid and Mongrel Lepidoptera.—On a previous occasion I suggested that those who were skilled in rearing Lepidoptera from the egg should turn their attention to experiments in hybrid breeding, which, so far, has not been attempted in any large way. Some idea of the possible results in this direction is to be found in the specimens obtained by Dr. Standfuss exhibited at the Royal Society and at the Natural History Museum, South Kensington. Among these there were hybrids developed from three different species, i.e. *Saturnia pavonia* (*carpini*), *S. pyri*, and *S. spini*. The labels bearing information were not easy to read, owing to the fact that they were obscured by the frame of the table-case in which the species were placed, but from what I could make out it would seem that hybrid males from a crossing of *S. pyri* and *S. pavonia* paired with female *S. spini*, producing most interesting offspring. In another series there were the mongrel progeny of crossings between (1) *Callimorpha dominula* ♂ and var. *persona* ♀, (2) *persona* ♂ and *dominula* ♀. For the information of those who may not be acquainted with the *persona* form of *dominula*, it may be well to state that it has much smaller spots on the fore wings, and the hind wings are black with an irregular yellow patch at the base and one or two small yellow spots beyond. In these mongrel specimens the characters of both parents were exhibited, but the tendency was stronger in the direction of *dominula*; the hind wings in both series were of the typical colour, but a trifle paler in series 2. The results of pairings between *Spilosoma mendica* and its var. *rustica* were somewhat similar to those obtained by Mr. Adkin a few years ago.—R. S.

Pieris brassicæ attracted by Artificial Flowers.—Whilst walking up Regent Street yesterday I noticed a *P. brassicæ* flying round and round the head of a lady who was wearing a hat trimmed with a large bunch of artificial lilies of the valley, it evidently mistaking them for the real flowers. It continued to follow her for some distance, and would undoubtedly have settled on the flowers had she not been walking at a quick rate, several times attempting to do so. It created a good deal of interest, several people stopping to notice it.—C. E. Bedford; Acton, W., May 28th.

Diloba cæruleocephala Feeding on Prunus lauro-cerasus.—This moth, which is generally common in the neighbourhood of Haywards Heath, has this season done very little damage to the sloe where the cherry laurel grew. I have no notes of the larva of *D. cæruleocephala* eating this shrub before.—H. W. Bell-Marley; June 17th, 1897.

[There are several records of the larva of *Diloba cæruleocephala* having been found feeding on *Prunus lauro-cerasus* in the 'Entomologist' for 1890.—Ed.]

The Lepidoptera of Middlesex.—In the 'Entomologist' (xxviii. p. 304) is a short note of the additions made to the list of Middlesex Lepidoptera in vol. i. of 'Harrow Butterflies and Moths,' published by the Harrow School Scientific Society. The second volume (1897) (J. L. Bonhote and N. C. Rothschild) completes the catalogue, and several species hitherto unrecorded, either by Mr. Cockerell (Entom. xxiv.–xxv.) or by me (Entom. xxvii.–xxviii.), are to be found in its pages. These are *Eupisteria obliterata* (1895), *Numeria pulveraria* (Bond), *Abraxas sylvata*, *Emmelesia unifasciata*, and *Eupithecia linariata*, *E. succenturiata*, *E. dodoneata* (Bond), *E. pulchellata*, *Hypsipetes ruberata* (Bond), *H. trifasciata*, *Cidaria immanata*, *C. prunata*, *Aglossa cuprealis* (Bond), *Scoparia cembræ*, *S. cratægella*, *Ebulea crocealis*, *Spilodes verticalis*, *Aciptilia galactodactyla* (Bond). The majority of these observations, as will be seen, were made by the late Mr. Bond before Kingsbury became suburbanized. But the diligence of local collectors elsewhere has restored to the list many Heterocera which might have been expected to be extinct so far as county Middlesex is concerned, Mr. Rhoades-Smith being apparently extremely successful. From the supplement to vol. i. it also appears that *Macroglossa bombyliformis* was taken by Mr. Bond at Kingsbury, while the record of *Trigonophora flammea* under my name in Mr. Cockerell's list is properly deleted, as it was included in the list sent by me to that gentleman in error (Entom. xxiv. 280).—H. Rowland-Brown; Oxhey Grove, Harrow Weald, May 30th, 1897.

Committee for Protection of Insects in Danger of Extermination.—At a meeting of the Committee held on June 2nd, it was resolved that the following species of Lepidoptera, being local species in danger of extermination, be more particularly recommended for protection in accordance with the final paragraph of the Memorandum of Association:—

Papilio machaon, L.
Leucophasia sinapis, L.
Pieris cratægi, L.
Melitæa athalia, Esp.
M. cinxia, L.

Nola albulalis, Hüb.
Eulepia cribrum, L.
Porthesia chrysorrhœa, L.
Clisiocampa castrensis, L.
Drepana sicula, Schiff.

Apatura iris, L.
Limenitis sibylla, L.
Thecla pruni, L.
Polyommatus arion, L.
Cyclopides paniscus, Fab.
Hesperia actæon, Esp.
Trochilium scoliæforme, Hüb.
Zygæna meliloti, Esp.
Z. exulans, Hoch.
Nola strigula, Schiff.
N. centonalis, Hüb.
Diphthera orion, Esp.
Acosmetia caliginosa, Hüb.
Dianthœcia irregularis, Hufn.
Plusia orichalcea, Fab.
Epione vespertaria, L.
Fidonia conspicuata, Schiff.
Scoria dealbata, L.
Cidaria reticulata, Fab.
Lithostege griseata, Schiff.
Agrotera nemoralis, Scop.
Pterophorus rhododactylus, Schiff.

Further resolved, that a copy of this list be forwarded to every Society co-operating with this Committee, with an explanation (where necessary) that the Committee does not desire to hamper any local Society in any more stringent action proposed to be taken by them for the protection of local species. Also resolved, that each such Society be invited to delegate one of its members, who shall be received as a member of this Committee.—Chas. G. Barrett, *Hon. Sec.;* 39, Linden Grove, Nunhead, S.E.

Correction.—Page 160, line 3, *for* north of Europe *read* north of Africa.

CAPTURES AND FIELD REPORTS.

Whit Monday at Oxshott.—The first objects to attract attention almost directly after leaving the station were the young pine trees. Almost every one of these showed signs of being attacked by *Retinia* larvæ. The leading shoots of a number were tenanted by *R. pinicolana*, and the side shoots of many others were badly infested by *R. buoliana*; the former mostly in pupæ, and the latter as larvæ, but about to pupate. Further on, among the birches, *Phlœodes demarniana* was obtained, altogether five specimens; three of these were disturbed from the foliage; one was found at rest on a birch-trunk, and another on a sprig of heath under a birch tree. *Eupœcilia nana* was common, but most of the specimens netted were worn. The only buckthorn bush I have observed in the locality was thickly populated by larvæ of *Gonopteryx rhamni* in all sorts of sizes, from recently hatched up to half grown; there were also a good many eggs on the under sides of some of the leaves. Mr. Forrester, who was with me, took some of the larvæ, and thus gave those that were left a better chance of feeding up. If the whole number had been allowed to remain the smaller ones must have fared badly, as the bush was certainly not large enough to nourish to maturity all the larvæ that we saw upon it. Soon after leaving the buckthorn I espied a specimen of *Drepana lacertinaria* at rest, and as this proved to be a female, I secured her in the hope that she might deposit some ova, but she failed to do so. The next insects to interest us were *Aspilates strigillaria*, which Mr. Forrester attended to, whilst I was engaged with *Phoxopteryx uncana;* the examples of the last-named species appear to me to be brighter than those I find in other localities. On the way to the larger pine trees a few larvæ of *Asphalia flavicornis* and some commoner things were observed, and a pupa of *Phycis betulæ* was taken.

The last-named species seems to be less common than it was some six or seven years ago at Oxshott. Being well among the pines, *Bupalus piniaria* was seen in numbers, with an occasional *Eupithecia indigata.* I made a long search for larvæ or pupæ of *Tortrix piceana*, but could not find the species in any stage, though judging from the number of twigs that had been cut from the smaller trees it appeared that some one had had better luck than myself. The extermination of this species in the Oxshott district by the avaricious collector is hardly probable, otherwise I might regret that I did not keep to myself what I know of it in its earlier stages. Several other insects than those referred to were seen, but the only ones worth mentioning were a specimen of *Bombyx rubi;* some *Retinia pinivorana* which were seen flying round the pines just before dusk; and three or four specimens of *Endopisa nigricana* that were netted in one sweep of the net. This last capture was rather curious; I noticed a Tortrix fly to and settle on the end of a branch of birch; the net was quickly after it, and when I came to examine what kind of beastie I had captured, I found several moths trying to regain their liberty. Four of these were boxed, and they all turned out to be *E. nigricana*, three males and one female. No doubt those that escaped were males of the same species, and it is most probable that all were attracted by the female. — RICHARD SOUTH; 100, Ritherdon Road, Upper Tooting, S.W.

SESIA CULICIFORMIS IN CHESHIRE.—On a visit of a few days last week to Delamere Forest, I had the pleasure of taking two fine specimens of *S. culiciformis*, on birch-leaves, basking in the sunshine. As I understand this insect has not before been taken in the forest, nor indeed in the county of Chester.—CHAS. F. THORNEWILL.

AMPHIDASYS BETULARIA VAR. DOUBLEDAYARIA IN THE LONDON DISTRICT.—On May 23rd I picked up a specimen of *A. betularia* var. *doubledayaria* in this neighbourhood. It is the first I have ever met with in the London district, although I have bred the type in large numbers.—A. W. MERA; 79, Capel Road, Forest Gate, May 24th, 1897.

LARVÆ OF BOMBYX NEUSTRIA have been and are still quite abundant in this locality this season. On May 17th I noticed as many as nine separate colonies in a distance of forty yards on blackthorn bushes, and last week as many feeding on sallow and osier. In other places, where the broods have separated, larvæ nearly full grown may often be seen. With regard to the present season, Lepidoptera here are fully two weeks later in their emergence compared with last year.—T. B. JEFFERYS; Laugharne, Carmarthenshire, June 14th, 1897.

LEUCOPHASIA SINAPIS, L., IN CO. WATERFORD, &c.—I am happy to say that this generally local and scarce butterfly has occurred not uncommonly at Curraghmore, near Portlaw, during the present season. I visited this locality on three occasions, and met with the butterfly on each; it was especially abundant on my last visit there, the 5th inst., and I took over a dozen specimens in fine condition, principally in a bit of marshy ground bordered by trees. I also had the pleasure of taking a single specimen of the "wood white," in an open space in a fir-wood situated on the slope of a low hill facing a boggy tract of land near Mileport in the Co. Kilkenny. I believe the Co. Kilkenny has not hitherto been recorded as a habitat for this local butterfly.—L. H. BONAPARTE-WYSE; Waterford, June 21st, 1897.

SOCIETIES.

Entomological Society of London.—*June 2nd.*—Mr. R. Trimen, F.R.S., President, in the chair. The President referred to the great loss which the Society had sustained by the death of Dr. Fritz Müller, one of its honorary Fellows, and to his distinguished services in the cause of entomological science, and especially in forwarding the theory of the origin of species. Dr. Chapman exhibited the larva of *Eriocephala allionella.* Mr. Jacoby exhibited a fine example of the large Hepialid, *Leto venus*, from Plettenberg Bay, South Africa. The President said that the insect afforded an interesting case of localised distribution, being confined to an area of about fifty by fourteen miles, whereas the larva fed in the wood of *Virgilia capensis*, a common and widely-distributed leguminous tree. The insect was very conspicuous, and could not have been overlooked in other localities. Mr. Burr showed a pair of gynandromorphous earwigs, *Chelisoches morio*, Fabr., from Java, with ordinary males and females for comparison. In both specimens the right branch of the forceps was of the male, and the left branch of the female form. De Bormans had recorded a similar case in *Labidura pugnax*, Kirb., from Burmah, in which also the right branch was male and the left female. In the National Collection there was a *Chelisoches morio*, in which the left branch was male and the right female. According to Brunner this phenomenon was not uncommon in the Forficularidæ, but Mr. Burr had heard of no other cases. The Hon. Walter Rothschild exhibited a series of specimens of *Eudæmonia brachyura*, Drury, and *E. argiphontes*, Kirby, to show the differences between these two West African Saturniid moths. The distinctness of the latter species had been doubted, as until recently it was only known by the unique examples in the Dublin Museum, and the three published figures of these were materially different from each other. A comparison of the series exhibited showed the two species to be abundantly distinct. Mr. Kirkaldy exhibited fifty specimens of *Notonecta glauca*, Linn., to show the extreme range in size and colour of this widely-distributed species, to which the Palæarctic *N. lutea*, Müll., was extremely closely allied, if not conspecific with it. The discussion on mimicry and homœochromatism in butterflies was then resumed by Dr. Dixey, who replied to the comments of Prof. Poulton and Mr. Blandford on his paper. He did not regard the phenomenon of reciprocal convergence as necessarily a demonstrable feature in Müllerian mimicry; it was merely potential. With respect to mimetic Pieridæ, he did not consider that they were invariably protected, but that, in certain cases, they were shown to be so by the indications of convergence exhibited by the models. Mr. Elwes thought, from his personal experience as a collector, that there was too much assumption about both the Batesian and Müllerian theories. In many supposed cases he doubted whether the so-called models were protected by taste or smell. He had previously referred to the extraordinary superficial resemblance between two Pieridæ found in the high Andes of Bolivia, and two others found at similar elevations in Ladak, and was inclined to think that similar conditions of environment produced similar effects. Mr. J. J. Walker, Sir George Hampson, and Col. Yerbury gave evidence, from personal experience in the Tropics, as to the extreme rarity of butterfly destruction by birds. The President admitted its rarity in Africa; but stated that he had seen birds, especially the Drongo shrike, chasing butterflies. Mr. Blandford called attention to a recent paper by M. Piepers, who, as the result of twenty-eight years' observation in the Malay region, had seen four instances only of butterflies, two of which belonged to the "protected" genus *Euplœa*, being attacked by birds, and had been driven to the conclusion that the phenomena of mimicry had nothing to do with natural selection. Papers were communicated by the Rev. F. D. Morice on "New or little-known Sphegidæ from Egypt"; and by Prof. J. F. Grote on "Changes in the Structure of the Wing of Butterflies." A special meeting was then held, at which the proposed amendments and additions to the Society's bye-laws were adopted.

South London Entomological and Natural History Society.—*May* 27*th*, 1897.—Mr. R. Adkin, F.E.S., President, in the chair. Mr. Bainbridge Prest, M.A., of Sydenham, was elected a member. Mr. South exhibited a box of Tephrosias, which he had purposely mixed as regards dates and localities. He asked for information as to names, but no one essayed to pick out the two forms. Mr. Auld, larvæ of *Boarmia roboraria* and *Limenitis sibylla* from the New Forest, and also larvæ of the two Phorodesmas, *P. bajularia* and *P. smaragdaria*, and remarked on the close similarity of the former, in its covering of oak remnants, to the groups of brown scales enclosing the buds on the oak twigs. Mr. Moore, male and female specimens of the remarkable Mexican Pierid, *Pyrisitia proterpia*, a bright and rich orange coloured insect. Mr. Tutt, specimens of *Ascalaphus coccjaus*, a Neuropterous insect allied to the ant-lions, from Digne, with notes on its history, variation, and occurrence. An allied species, *A. maccaronius*, was described by Scopoli as a butterfly. Mr. Edwards, a living mantis sent from Cannes by Dr. Chapman. He had had it some six weeks, and it fed readily upon small cockroaches and flies. He also showed young larvæ of *Saturnia pavonia* from ova laid by a female taken at Digne. Mr. Adkin, series of *Cidaria suffumata* from various localities, including Forres, Dover, Box Hill, and Loch Laggan. Those from the latter locality were var. *piceata*. Mr. Tunaley, specimens of the resinous nodules of pine sent him from Scotland, from which he had bred *Retinia resinella*. He also showed sections of the same, and made remarks upon the peculiarities of the cocoon and the method of emergence of the species. Dr. Chapman exhibited, among other insects, a living specimen of *Charaxes jasius*, which had just emerged from the pupa of a larva taken at Cannes. Mr. Tutt read a paper entitled "Spring Butterflies on the Riviera," and exhibited a large number of species in illustration.

June 10*th*.—The President in the chair. Mr. Jas. N. Smith, 28, Eastdown Park, Lewisham, was elected a member. Mr. Mansbridge exhibited a larva of *Tephrosia crepuscularia* beaten from yew, and a short series of imagines bred as a second brood from larvæ taken at the same place last year. He stated that the larvæ of *T. biundularia* from both Yorkshire and Epping were quite distinct from the larvæ of *T. crepuscularia* in marking and coloration. Mr. Tutt remarked that the young larvæ of both species were similar to the young larvæ of the Ennomids in being black with more or less complete white rings, but said that such similarity did not necessarily show close relationship always. Mr. Malcolm Burr, a few insects from the island of Socotra, and said that at a casual glance the fauna seemed to represent a transition from the Palæarctic to the Æthiopian region. Mr. Turner, flowers of the bogbean (*Menyanthidis palustris*) and of the cinquefoil (*Potentilla comarum*) from the neighbourhood of Woolmer Forest. Mr. Lucas, ichneumons which had emerged this year from last year's cocoons of *Zygæna trifolii*, and also an earwig (*Chelisoches morio*) from Java, of which species two examples have recently been taken at Kew. In the discussion, several curious instances of parasitism were noted. Mr. Tutt mentioned a parasite on the larvæ of *Melitæa aurinia* which had three separate emergences during the life of its host. Mr. Hall said that a particular ichneumon was entirely confined to the young stage of *Cucullia verbasci*. Mr. Adkin, a series of both captured and bred specimens of *Tæniocampa gothica* from Loch Laggan. The captured examples were largely *gothicina* forms, while the latter were very typical, although the ova were from females of the former variety.—Hy. J. Turner, *Hon. Report. Sec.*

RECENT LITERATURE.

Mittheilungen aus dem Roemer-Museum zu Hildesheim. Nr. 8. Februar, 1897. Die Schmetterlingsfauna von Hildesheim. Von A. Radcliffe Grote, A.M.

Some years ago Mr. A. R. Grote, after rendering great service to the study of North American Lepidoptera, removed to Germany, and settled at Hildesheim, where he has begun to publish a series of very useful works on the classification of Lepidoptera, chiefly as worked out by the neuration. The present work is only secondarily a local list of the not very rich local fauna of Hildesheim (about eighty species of Rhopalocera), but is chiefly devoted to an elaborate description of the neuration of the families and subfamilies of butterflies, illustrated by four excellent plates. Mr. Grote does not adopt the usual German system of counting the nervures upwards, but counts them downward, like the American writers, calling the three principal nervures, radius, media, and cubitus, and numbering them iii., iv., and v. These correspond to those frequently called in England the subcostal, median, and submedian nervures respectively. Mr. Grote admits twelve families of butterflies, of which two are not represented in Europe; but it strikes us as somewhat singular that while classing together the Parnassiidæ and Papilionidæ as Parnassi-Papilionidæ, he should group the remaining ten families together as Pieri-Hesperiidæ, thus uniting the

Hesperiidæ and Megathymidæ more closely with the bulk of the Rhopalocera than the two first families mentioned. Although this classification may be partially borne out by the neuration, we do not think it can be supported by other parts of the structure of the insect.

The Young Beetle-Collector's Handbook. By Dr. E. Hofmann, Curator of the Royal Natural History Museum at Stuttgart. With an Introduction by W. Egmont Kirby, M.D., Joint Author of 'British and European Butterflies and Moths,' 'Beetles, Butterflies, Moths, and other Insects,' &c. Illustrated by twenty coloured plates, comprising over 500 figures. (Swan Sonnenschein & Co. 1897.)

The Coleoptera, or beetles, form one of the largest orders of insects, and an introductory book with plenty of illustrations was greatly needed by beginners taking up the study. Nothing could be better as an introductory book than Rye's 'British Beetles,' but the number of species described and figured in that book is too small to carry the beginner very far; and of the larger and more complete works, Cox's gives only descriptions, while Fowler's is too large and expensive for many who might wish to possess it. Nor is it well for a beginner to commence with too large a book, which is liable to confuse and discourage him. It is much better to begin with a smaller one, and then to proceed to the more complete ones when he has already sufficiently mastered the subject to be able to understand and use them with more or less advantage.

The little book before us will be very useful to schoolboys and residents in the country who are inclined either to begin to collect beetles, or who feel sufficient interest in those which they may happen to meet with to wish to know something about them. It was of course impossible to describe and figure *all* the 3000 British beetles in a small space, but a large number of representative species are figured and briefly described, with special reference, in many cases, to habits and transformations; while the Introduction, contributed by Dr. W. Egmont Kirby, deals briefly with such subjects as the structure, development, and habits of beetles, with instructions for collecting.

As the book is evidently the adaptation of a German work, a few species are figured and described which are not included in the British lists, but these are distinguished by the want of an asterisk before their names, and their presence is no disadvantage, for it counteracts the now rapidly subsiding prejudice in favour of restricting our interest to British species; while from another point of view it will be useful, because several of the species thus figured have either been reputed British, or are liable to be introduced into England from time to time with vegetables or timber.

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SPILOSOMA MENDICA AND ITS VAR. *RUSTICA* INTERBRED.

By ROBT. ADKIN, F.E.S.

THE concluding sentence of the note on "Hybrid and Mongrel Lepidoptera" (*ante*, 197) renders desirable the publication of details of the pairing of the English and Irish forms of *Spilosoma mendica* which I obtained some time since, but which have not previously been placed on record.

The stock from which the Irish form (var. *rustica*) was reared I received as ova in May, 1886, it having then been once inbred (Proc. South Lond. Soc. 1887, p. 90), the parent moth having been taken in Co. Cork. The English stock (typical *mendica*) came to me some three weeks later, also in the form of ova, and once inbred from a moth taken in the north of London. In each case fine broods were reared in 1887, the largest Irish males measuring 40 mm. in expanse, thus comparing favourably with the only two captured Irish examples I possess, which both expand 36 mm., and the largest females of the brood measure 46 mm. The English males reared in 1887 expanded 36 mm., and the females 42 mm. Ova were obtained from both broods, but the larvæ resulting began to show signs of degeneracy, the percentage of deaths being larger than in the previous generation, especially among those of the Irish brood; and the imagines emerging in 1888 were slightly smaller, the largest Irish male being 38 mm. and females 42 mm. in expanse. Thus far the English moths had all emerged before the Irish began to appear (possibly the removal northward may have accounted for the lateness of the latter), thus preventing the possibility of the cross-pairing I so much wished to obtain. Continuing the broods, further signs of degeneracy manifested themselves; many ova did not hatch, the larvæ were sickly, and a large percentage died, and the few moths that came forth in 1889 were miserable little creatures; however, as a diminutive Irish male (32 mm.), one of the whitest that I had seen, and a small English female (36 mm.), happened to emerge on the same day, they were put together; on the following morning they were paired, and ova were deposited same evening. The majority of these ova showed by ultimately turning colour that the larvæ in them were alive, but only four came forth, three fed up well and pupated, the other lingered on for an unduly long time and died; but the only imagines that resulted were two full-sized males, measuring respectively 38 mm. and 37 mm. in expanse. Throughout the series of broods, due care was taken to keep the larvæ supplied with a sufficiency of fresh food and to prevent overcrowding.

The colour of the English males was uniformly the typical sooty brown; that of the Irish males varied from creamy white to pale ochreous brown, the females of both forms being alike, *i. e.*, the typical smoky white. The crossbred examples most nearly resembled the darkest of the Irish form, being of the same pale ochreous brown colour but with a smoky tone and the fringes faintly paler.

July, 1897.

CONTRIBUTIONS TO THE GEOGRAPHICAL AND VERTICAL DISTRIBUTION OF THE RHOPALOCERA IN THE HAUTES-PYRÉNÉES.

By W. Harcourt-Bath.

The following paper is the result of a preliminary visit which I paid to the Central Pyrenees, situated in the French Department of the Hautes-Pyrénées, during the latter half of July and the beginning of August last year. I have already given an account of the vertical zones, together with a brief sketch of the vegetation, in a previous article in the 'Entomologist' (November, 1896).

Although the scenery in the region under consideration is generally far grander than in that portion of the chain included in the Department of the Pyrénées-Orientales, the Rhopalocera fauna of the former is not so rich. Unfortunately I was not favoured with very good weather; half the time I was there it was either wet or dull, while during the same period the whole of Europe to the north was enjoying a drought of almost unprecedented severity; but it is generally the case that when anticyclonic conditions prevail in Central Europe, the weather further south is as a consequence bad. It was in fact one of most rainy seasons that they have had in the Pyrenees for a long time, so that grave fears were entertained lest the grape crop should prove a failure on account of the insufficiency of the necessary amount of sunshine. Butterflies were as a consequence, with a few exceptions, neither in the best of condition nor very plentiful, at least as regards the number of individuals was concerned, but I managed to meet with a fair number of species considering; thus the total that I saw was seventy-seven, while the sum-total actually captured amounted to seventy-four, without counting varieties and aberrations.

The two headquarters of the alpine Rhopalocera fauna, as well as that of the alpine flora, is at Gavarnie and Héas, namely, in the Cirque de Gavarnie and the Cirque de Troumouse respectively, both of which localities I visited. The scenery, especially at that of the former place, is superb in the superlative degree. Every evening during my stay at Gavarnie—after a hard day's work among rocks and bushes on the rugged mountain slopes in search of butterflies—I went off to witness the magnificent spectacle of the sunset on the snow-clad summits surrounding the Cirque, or to obtain a near view of the wonderful "Cascade," the second highest waterfall in Europe, 1266 ft. in altitude, to which I felt attracted almost as if by a magnet. The best view of the celebrated Cirque is to be had about two miles along on the Bucharo Pass or Port de Gavarnie, from the summit of which, about 7500 ft. in elevation, a good view can also be obtained over the Spanish side of the chain.

The Cirque de Troumouse is also a most romantic spot, surrounded by gigantic snow-clad peaks, from the glaciers of which descend numerous waterfalls and torrents in all directions. In this lonely and wild locality the peculiar bleat of the chamois can constantly be heard from among the rocks which it so much resembles in colour, while high overhead vultures and eagles occasionally will be seen on outstretched wings soaring round some lofty crag, or wheeling in circles at immense altitudes in the air, and gliding along in the most graceful manner imaginable.

Upon several occasions I climbed above the clouds, and to my great delight found, as it were, a new world awaiting me, with butterflies flying about in the bright sunshine, while down below, many hundreds of feet, they were all wrapped in sleep beneath the nubiferous pall-like canopy. Only those who have experienced it can possess any conception of the excessive pleasure it is to be butterfly-hunting among these snow-clad mountains when there is an azure-blue sky overhead, and the snow-fields and glaciers glitter and shine like diamonds all around.

The scenery at the lower elevations is also very magnificent. All along by the side of the road usually runs a roaring torrent, locally known as a "gave," which rushes and foams among moss-covered rocks and boulders with a deafening noise; frequently it is seen at the bottom of a steep ravine three or four hundred feet in depth, while the mountains rise immediately above the path in a precipitous manner, forming romantic gorges and defiles, such as the Gorge de Pierrefitte and the Gorge de St. Sauveur, box and arborescent heath, besides a multitude of other shrubs, trees, and plants, growing out of the crevices of the rocks in all conceivable ways and means. Landslips and other convulsions of nature have produced some wonderful wildernesses and scenes of desolation in certain places, such, for instance, at the Chaos of Héas and the Chaos of Gèdre, where rocks and boulders of all shapes and sizes are strewn about in endless confusion for several miles in extent. On a moonlight night especially the appearance they present is weird in the extreme. Here and there they produce a most remarkable life-like appearance, many of the rocks being vested with almost a human aspect as they rise above the sky-line in all sorts of angles and attitudes.

The scenery of the Pyrenees is on the whole wilder than that occurring in the Alps, at least according to what has been my experience as the result of three visits to the latter range; but it is certainly not so grand, although here and there it is almost equally magnificent. Accommodation is not so good as in the Alps, there being no hotels or mountain châlets at high altitudes, so that much more exertion is necessary in order to reach elevated situations. Instead of roads one has frequently to traverse a narrow track or mule-path in order to visit some out-of-the-way village, such as Héas, where the fastidious may not find the food always to their satisfaction, although I am prepared to rough it wherever I go.

The following is a list of the Rhopalocera which I met with in the Hautes-Pyrénées; no mention is made therein of those which I obtained on the Spanish side of the chain, as they would be out of place in this paper. I have also given the localities, the approximate altitudes above the sea-level in parentheses, and added a few notes respecting morphology and relative frequency, &c.

Papilionidæ (three species).

Papilio machaon. Scarce; Gorge de Pierrefitte, Port de Gavarnie (2000–5500 ft.). Ground colour rich yellow.

Parnassius apollo. Abundant everywhere, especially at the Gorge de Pierrefitte, Héas, Gavarnie, Chaos de Gèdre, &c. (2500–6500 ft.). The sexual dimorphism is very pronounced, the males being respectively lighter and the females darker than is the case in the Alps. I obtained between fifty and sixty ova from one female, which I kept in a warm room upon my return home, and they all hatched out between the 2nd and the 4th of January this year. Not having any sedums to feed them on, I supplied them with "London pride" and *Arabis alpina*, the nearest representatives of the saxifrages which the larvæ are said to live upon, both plants being plentiful in the Pyrenees; but they would not touch them, and in consequence all died. The ova are round, somewhat concave at the sides, possessing in this respect a superficial resemblance to a broad bean. They are of a slaty grey colour, and possess a very tough epidermis. The young larvæ were very lively, and crawled about with a rapidity more like the caterpillars of certain Bombyces, to which also the ova possess a close resemblance. —*P. mnemosyne.* Cirque de Gavarnie and Cirque de Troumouse; single specimens only (5000–5500 ft.).

PIERIDÆ (nine species).

Aporia cratægi. Very abundant everywhere, especially at Gavarnie, St. Sauveur, and Pierrefitte (1800–5500 ft.). Among the series obtained are some dwarf specimens, produced probably by semi-starvation.

Pieris rapæ. Scarce, except at Pierrefitte, Gavarnie, and St. Sauveur (1800–5000 ft.). Variable in size.—*P. napi.* Scarce; Pierrefitte, St. Sauveur (1800–3000 ft.). At both localities I obtained representatives of the first and second broods. Those of the latter are of the South European type, being very large and white with very pale yellow under sides, the veins being indistinct, in which latter particular similar specimens occur in the Midlands and South of England during very hot summers as occasional aberrations of the second generation.—*P. daplidice.* One specimen at Gavarnie (5500 ft.). It is intermediate between the type and the var. *bellidice.*—*P. callidice.* Port de Gavarnie (6500–7000 ft.). Saw several specimens, but did not succeed in capturing any, as their flight is exceedingly swift, making it difficult to chase them over rocky ground.

Leucophasia sinapis. Scarce; Pierrefitte, St. Sauveur (1800–3000 ft.).—Var. *diniensis.* One specimen at Pierrefitte (1800 ft.).

Colias edusa. Scarce; Pierrefitte, Gavarnie (1800–5500 ft.).—*C. phicomone.* One specimen at Gavarnie (5500 ft.). (I did not see *C. hyale* at all in the Pyrenees, but observed many specimens of it when travelling through France by rail.)

Rhodocera rhamni. Scarce; Pierrefitte, St. Sauveur, Gavarnie (1800–5500 ft.).

LYCÆNIDÆ (nineteen species).

Thecla ilicis. A few specimens, but worn, in the Gorge de Pierrefitte (2500 ft.). (I saw specimens of another *Thecla* near the Port Napoleon at St. Sauveur, flying about the tops of the trees in the ravine, but was unable to get near enough to identify same.)

Chrysophanus virgaureæ. Abundant and generally in good condition at Gavarnie and Héas (5000–6000 ft.). Many of the males possess a black discoidal spot on the anterior wings, but I did not meet with the var. *meigii.*—*C. hippothoë.* Abundant and in tolerably fair condition at Héas and Gavarnie (5000–5500 ft.). The females are very variable as regards size, and they often possess a melanochroic tendency, but I saw nothing in either sex approaching the alpine var. *eurybia.*—*C. dorilis.* Common but worn at Gavarnie (5000–6000 ft.).—Var.

subalpina. Gavarnie; more abundant than the type (5000–6000 ft.).—*C. gordius.* Gavarnie, St. Sauveur, Pont de Scia (3000–5500 ft.). Exceedingly fine specimens occur in the Pyrenees with a very vivid violet reflection, but I only took a small series.

Lycæna ægon. St. Sauveur, Gèdre, Héas, and Port de Gavarnie. Exceedingly abundant at the latter locality (3000–7000 ft.). Most of the male specimens possess wide black borders to all their wings, as in the Alps at the lower elevations.—*L. argus ?.* Gavarnie (5500 ft.).—*L. orbitulus.* Gavarnie; scarce (5000 ft.).—*L. eros.* One worn specimen, Port de Gavarnie (6000 ft.).—*L. icarus.* Scarce at Pierrefitte and St. Sauveur (1800–3000 ft.). — *L. eumedon.* One specimen at St. Sauveur (3000 ft.).—*L. escheri.* A small series at St. Sauveur, Héas, and Gèdre (3000–5500 ft.). Smaller in size than those found in the Alps.—*L. astrarche.* Scarce at Pierrefitte, Gèdre, Gavarnie, and Héas (1800–5500 ft.).—*L. bellargus.* One specimen at St. Sauveur (3000 ft.).—*L. corydon.* Abundant; Port de Gavarnie, Héas, Gèdre, Pont de Scia (3000–5500 ft.). Rather small, but richly coloured specimens.—*L. hylas.* Abundant; St. Sauveur, Port de Gavarnie, Héas, Gèdre, Pont de Scia (3000–5500 ft.). — *L. minima.* Scarce; Héas, St. Sauveur, Port de Gavarnie (3000–5500 ft.).—*L. semiargus.* Scarce; Port de Gavarnie, Héas (5000–5500 ft.).—*L. arion.* Not common; Pierrefitte, Héas, Gavarnie (1800–5500 ft.). The specimens resemble those found in the Alps, which are not so blue as those occurring in the plains.—Var. *obscura.* Gavarnie and Héas (5000–5500 ft.).

APATURIDÆ (two species).

Apatura ilia var. *clytie.* One worn specimen at St. Sauveur (3000 ft.).—*A. iris.* I believe I saw a specimen of this insect at Pierrefitte (1800 ft.), but as it is very scarce and local in the Pyrenees, I will not be sure.

NYMPHALIDÆ (nineteen species).

Limenitis camilla. Scarce at St. Sauveur and Gorge de Pierrefitte (2500–3000 ft.).

Vanessa c-album. Not uncommon at Gèdre and St. Sauveur (3000–3500 ft.). The light form only.—*V. urticæ.* A few specimens at Gavarnie and Héas (5000–6000 ft.). Larvæ abundant at the former locality on nettles.—*V. antiopa.* One very worn hybernated specimen at Gèdre (3500 ft.).—*V. atalanta.* Not uncommon at Pierrefitte, St. Sauveur, Gèdre, Port de Gavarnie (3000–7500 ft.). On the last-named pass I saw a specimen at the summit which possessed a predilection for settling upon the stone which marks the boundary between France and Spain.—*V. cardui.* Scarce; Port de Gavarnie (5500 ft.). Saw a few larvæ at Héas feeding on thistles.

Melitæa phœbe. One specimen at Gèdre (3500 ft.).—*M. didyma.* Not common; Port de Gavarnie, Gèdre, Gorge de Pierrefitte (2000–5500 ft.).—Var. *alpina.* Occasionally with the type. — *M. athalia.* Héas, St. Sauveur, Pierrefitte (1800–5500 ft.). Variable, but not abundant, except at Pierrefitte, where, however, it was rather worn.—*M. parthenie.* Rather scarce; Port de Gavarnie, Héas (5000–6500 ft.). Somewhat intermediate between the type and the alpine var. *varia.*—

M. dictynna. Not uncommon at Pierrefitte, Cirque de Gavarnie, and Cirque de Troumouse (1800–5500 ft.).

Argynnis euphrosyne. One worn specimen at Gavarnie (5500 ft.).—*A. pales.* Not uncommon at Gavarnie and Héas (5000–6000 ft.).—Var. *isis.* Héas (5500–6500 ft.).—*A. dia.* Scarce at Pierrefitte (1800 ft.).—*A. latonia.* One specimen at Héas (5000 ft.).—*A. aglaia.* Abundant and in good condition; Gorge de Pierrefitte, Gèdre, Gavarnie, Héas (2000–5500 ft.).—*A. niobe* var. *eris.* Abundant at Gavarnie, at the base of the Pic de Pimené (5000–5500 ft.). Under side much lighter than in the Alps, and markings more obscure. The type does not occur at all.—*A. adippe.* Not common; Pierrefitte, St. Sauveur (1800–3000 ft.).—Var. *cleodoxa.* Gèdre (3500 ft.), where it replaces the type.—*A. paphia.* St. Sauveur (3000 ft.).

SATYRIDÆ (sixteen species).

Melanargia galatea. Very abundant and in good condition, except at the lower altitudes; Valley de Lanedan, Pierrefitte, St. Sauveur, Gèdre, Pont de Scia, Port de Gavarnie (1500–5500 ft.).

Erebia epiphron var. *cassiope.* Port de Gavarnie, Héas (5500–6000 ft.).—Var. *pyrenaica.* Port de Gavarnie, Héas (5500–6000 ft.). Abundant, but local. Intermediate forms between the two varieties are of frequent occurrence, so that it is often a difficult matter to separate them.—*E. manto* var. *cæcilia.* A small series at Héas, in good condition and apparently only just emerging (5000–5500 ft.).—*E. stygne.* Exceedingly abundant at Port de Gavarnie, Héas, Chaos de Gèdre (4500–7500 ft.). This is by far the most common species of *Erebia* in the Pyrenees, but does not exhibit a great amount of variation, except as regards the ocellation. It is a positive nuisance in some places.—*E. melas* var. *lefebvrei.* Common on the summit of the Port de Gavarnie, but very worn (7000–8000 ft.). I think this species is here intermediate between the variety named and the type.—*E. tyndarus* var. *dromus.* Very abundant; Port de Gavarnie, Cirque de Troumouse, Héas (5500–8000 ft.). This insect is a beautiful object when flying, the wings flashing with an iridescence in the bright sunshine like flakes of silver.—*E. gorge.* One specimen at Héas (6000 ft.).—Var. *gorgone.* Port de Gavarnie (6000–7500 ft.). A small series, but in good condition.—*E. euryale.* Héas; very abundant (5500–6500 ft.).—Var. *euryaloides.* Three specimens of this interesting variety at Héas (5500–6500 ft.). They are quite black and unspotted, and I think they must be identical with the form found in Lapland. I am not aware that it has been recorded from the Pyrenees before. The species varies considerably here in the degree of ocellation, the variety named being the extreme form in this respect.

Satyrus alcyone. St. Sauveur, Gèdre, Pont de Scia (3000–3500 ft.). A small series, but in good condition. This insect loves to settle upon rocks by the roadside, like most of the other members of the genus.

Pararge mæra var. *adrasta.* Exceedingly abundant at Pierrefitte, Gèdre, Gavarnie, and Héas (1800–6000 ft.). All the specimens which I took can, I think, be referred to this South European form; the females most certainly can be. I did not meet with any specimens even at the highest elevations so dark as is the type in the Alps.—*P.*

megæra. One specimen at Gavarnie (5500 ft.).—*P. egeria.* Pierrefitte, Gèdre (1800–3500 ft.). A small series only. I do not think the var. *egerides* occurs here at all.

Epinephele ianira. Abundant everywhere, especially at Gèdre, Pierrefitte, St. Sauveur, Gavarnie, and Héas (1800-5500 ft.). The Austral var. *hispulla* occurs with the type at all altitudes as an aberration.—*E. tithonus.* A few specimens at Pierrefitte and St. Sauveur (1800–3000 ft.). The borders of the wings are very dark.

Cænonympha arcania. Very plentiful, especially at St. Sauveur and Port de Gavarnie (3000–5500 ft.).—*C. pamphilus.* Not uncommon at Port de Gavarnie and Héas (5000–6500 ft.). As in the Alps, the markings upon the under side of the posterior wings are very obscure, and the ocellation almost entirely absent. Altitude does not appear to have anything to do with it. One male specimen possesses a melanic tendency, being thickly clothed with black scales on the upper side, while a female I took is very large and of a rich orange colour, much more intense than the type.

Hesperidæ (nine species).

Spilothyrus altheæ. Not uncommon at St. Sauveur, Gèdre, and Pont de Scia (3000–3500 ft.), settling upon the middle of the road, and possessing a special predilection for horse-manure.—*S. lavateræ.* Two rather small specimens at Gavarnie (5000–5500 ft.).

Syrichthus carthami. Plentiful at St. Sauveur, Port de Gavarnie, Héas, and Gèdre (3000–5500 ft.). Fond of settling upon the road.—*S. alveus.* Plentiful at Héas (5000–6000 ft.).—*S. sao.* Single specimens at St. Sauveur at Gavarnie (3000–5000 ft.).

Hesperia thaumas. Scarce; Gavarnie, Gèdre (3500–5500 ft.).—*H. lineola.* Scarce; St. Sauveur, Héas (3000-5500 ft.).—*H. actæon.* Scarce; St. Sauveur, Gèdre (3000–3500 ft.).—*H. sylvanus.* A few specimens at Pierrefitte, St. Sauveur, and Gavarnie (1800–5500 ft.).

Birmingham, January 25th, 1897.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 131.)

Acidalia remutaria, *Hb.*—This insect seems somewhat restricted in distribution to the south and west, where in some localities it is very abundant. On the east coast Professor Hart reports it from Castle Bellingham, Co. Louth, and Birchall gives Wicklow. About Killarney and Kenmare it is very common; on the shores of L. Derg and Lower Shannon; Clonbrock, Castle Taylor, and Merlin Park, Co. Galway; Knocknarea (*R.*), and abundant at Rockwood, Sligo. The var. *lactata*, Haw., occurs at Killarney with the type.

Acidalia fumata, *St.*—Said by Birchall to be widely distributed. I have rarely taken it, but may have overlooked it. Killarney and Caragh L. Kerry; Framore, Co. Waterford; and Clonbrock, Co. Galway.

Acidalia imitaria, *Hb.*—Cork and Kerry (*B.*); Tinahely, Co. Wicklow, not rare (*Bw.*); Portmarnock, Co. Dublin (*Low*).

Acidalia aversata, *Hb.*—Both the pale and ochreous forms are widely distributed and abundant. The var. *spoliata* seems rare.

Acidalia inornata, *Haw.*—Rare. Kingstown (*B.*); Derry (*C.*); and Birchall and myself both have captured it at Killarney.

Timandra amataria, *L.* — Galway (*B.*), Clonbrock, a few (*R. E. D.*); Kerry (*B.*).

Cabera pusaria, *L.*—Extremely common.

Cabera rotundaria, *Haw.*—Whether this is a true species or not has been questioned. The late Stephen R. Fetherston-H. bred two very striking examples from larvæ taken by him at Glenmore, Crossmolina, Co. Mayo. They are now in the Museum of Science and Art, Dublin.

Cabera exanthemata, *Scop.*—Very abundant everywhere. I have a curious form from Co. Tyrone in which the first and second line approximate just below the costa on both fore and hind wings, with a shaded patch at the junction.

Bapta temerata, *Hb.*—A local insect, though its food-plant is widely spread through Ireland. Abundant in many parts of Galway, such as Clonbrock and Merlin Park; also at Ardrahan. At Mucross, Killarney; Powerscourt, Wicklow, a few.

Bapta bimaculata, *Fb.*—Several stated to have been taken at Clonbrock by the Hon. R. E. Dillon. It was recorded in error, I believe, by Birchall from Killarney, as also Macaria notata, of whose occurrence I have been able to get no Irish records whatever.

Macaria liturata, *Clerck.*—Widely distributed. Near Dublin; Bray, Powerscourt, and Greystones, Co. Wicklow; near Milepost, Kilkenny (*Wyse*); Cappagh, Co. Waterford; Ballyvourney, and Macroom, Co. Cork; Kenmare and Killarney abundant, Kerry; Mote Park, Roscommon; Clonbrock, Dalyston (*R. E. D.*), and elsewhere in Co. Galway; Rathowen (*Curzon*), and Killynon, Co. Westmeath; Agher, Co. Meath (*Miss R.*); Newcastle, Co. Down (*Bw.*).

Halia vauaria, *L.*—Curiously enough, though existing in Ireland, it is extremely scarce. Single specimens for the most part have been taken at Powerscourt, Co. Wicklow; Howth, a few (*M. F.*); Castle Bellingham (*Thornhill*); Favour Royal, Tyrone; Derry, a few (*C.*); Cromlyn (*Mrs. B.*), Westmeath; Rockwood, Sligo; Clonbrock, three (*R. E. D.*), Co. Galway; and Killarney.

Halia brunneata, *Thnb.*—No Irish capture recorded except one specimen at Clonbrock (*R. E. D.*).

Strenia clathrata, *L.*—Occurs throughout Ireland here and there in meadows. Is very variable in the breadth of the black markings, of which the transverse streaks offer every possible variety of mutation. In a series of specimens, each streak in turn may be found to be broad, attenuated, or almost obsolete, the rest being normal; so that a long list of aberrations could easily be compiled if it served any scientific purpose. The ground colour is sometimes yellowish, but usually nearly white, but examples occur in which it is dusted with dark specks.

Panagra petraria, *Hb.*—Local, but abundant where found. Wicklow (*Bw.*); Curraghmore, abundant (*Wyse*), and Cappagh (*Miss V.*), Co. Waterford; Killarney, near Torc Waterfall, and in a glen near Sneem, Co. Kerry; Doneraile, Co. Cork (*Stawell*); Clonbrock, and Merlin Park, Galway; Mote Park, Roscommon; Toberdaly, King's Co.

Numeria pulveraria, *L.*—Very generally distributed in Irish woodlands; sometimes attaining an expanse of nearly one and a half inches. Varies in colour from a warm sepia tint to a bright ferruginous brown. An aberration from Clonbrock has the central band of the fore wing obsolete, excepting two dark striæ representing its outer and inner edges. This is a tendency shown by many geometers which normally have a central transverse band. Localities:—Clonbrock, Merlin Park, Moycullen (*Miss R.*), Kylemore (*Hon. E. Lawless*), and Ardrahan (*Miss N.*), Co. Galway; Rockwood, near Sligo, abundant, and Markree; Farnham, Cavan; Altadiawan, and Favour Royal, Co. Tyrone; Drumreaske, Co. Monaghan; Ballycastle, Co. Antrim, and on the shores of L. Foyle; Powerscourt, Co. Wicklow; Ardtully (*Miss V.*), and Killarney, &c.

Scodiona belgiaria, *Hb.*—Frequently met with on bogs through Ireland, but I have never found it in numbers. Near Cromlyn, and Killynon, &c., in Westmeath; Mohill, Co. Leitrim; about Ballinasloe, not rare, Clonbrock (*R.E.D.*), and Kilcornan, Co. Galway; Markree, and hills above Rockwood, Sligo; Altadiawan, Tyrone; Mourne Mts. (*W.*); Churchill, Co. Armagh (*J.*); near Clondalkin, Co. Dublin (*Grierson*); Glandore, and Castletownsend, Co. Cork (*D.*); Castletown, Berehaven (*Carpenter*), and Killarney, Kerry; Giant's Causeway (*Bw.*); and a few near Derry (*C.*).

Selidosema ericetaria, *Vill.*—Strangely enough, this moth, so local in England, is widely distributed through the central, southern, and western heathy tracts of Ireland, occasionally in some numbers. In France it is very local, and never very abundant, on warm hillsides (*Berce*). It is shy, and a fast flier on hot days, but towards dusk is more easily netted. Common at Killarney (*B.*), and in a field near the Sneem oyster-beds, Co. Kerry (*R.*); Kinsale, abundant, Co. Cork (*S.*); near Fannin Lock, on the Ballinasloe Canal, not rare; Clonbrock, one (*R. E. D.*), and Recess (*Wolfe*), Co. Galway; Mote Park, Roscommon; Killynon (*Miss R.*), and Cromlyn (*Mrs. B.*), Co. Westmeath; Churchill, Co. Armagh, in numbers (*J.*).

Ematurga atomaria, *L.*—Everywhere abundant on heaths. Variations are numerous in both sexes, but I have never met with a form in Ireland which seems local at Folkestone, and occurs of large size in Switzerland, the males reaching almost one and a half inches in expanse. It is characterised by the deep and regular serration of the outer edge of the elbowed line, and the ground colour clearer and less dusted with black in both sexes. The males are especially bright, the pale band beyond the elbowed line being bright ochreous, almost unspeckled. Considering how handsome a form the continental specimens assume, it would seem worthy of enquiry whether it occurs elsewhere in England, perhaps in chalk districts; and if local, it deserves a varietal name. The females are less remarkable, the serrations being principally shown on the band of the hind wings.

Bupalus piniaria, *L.*—Very local in Ireland, but there abundant. Donard demesne, near Newcastle, Co. Down (*Bw.*); Co. Wicklow (*G. Foster*), where Professor Hart has met with it since abundantly over a considerable area about Glendalough; Doneraile, Co. Cork, three (*Stawell*); near Milepost, Co. Kilkenny (*Wyse*); var. *flavescens*, Agher, Co. Meath (*Miss R.*).

[Scoria dealbata, *L.*—Recorded by Birchall from Killarney, but he also stated (*in litt.*) that the locality of occurrence was near Dublin. An error has apparently crept in, and the record must be deleted.]

Sterrha sacraria, *L.*—One specimen at Killarney in 1864 (*B.*).

Aspilates strigillaria, *Hb.*—This is abundant where found, but I consider it is rather local, though it occurs in most counties which possess bogs. I have met with it in Sligo, Galway, Mayo, Kerry, and Westmeath.

[Aspilates ochrearia, *Rossi.*—Birchall's locality of Powerscourt, Co. Wicklow, wants confirmation.]

Aspilates gilvaria, *Fb.*—Very local and scarce. Powerscourt

(*B.*), and Howth, one or two specimens (*G. V. H.*); Kilcornan (*B.*), Ardrahan (*Miss N.*), and Clonbrock, three (*R. E. D.*), Co. Galway; Magilligan, Co. Derry (*Curzon*).

Abraxas grossulariata, *L.*—Very common.

Abraxas sylvata, *Scop.*—Very local and not usually numerous. Mr. Bristow took one at Coolkenna, Co. Carlow (not Wicklow, as stated in Birchall's 'Catalogue'). At Killarney fairly abundant on Torc, and Mr. Watts took one at Tower Lodge. Two at Clonbrock (*R. E. D.*), one of them having the ground colour clouded with grey on the outer half of all the wings.

Ligdia adustata, *Schiff.*—Not often met with in the east or north. Occurs not infrequently in many southern counties, but appears generally pretty common west of the Shannon. Howth, scarce; Co. Wicklow (*B.*); Clonbullogue (*C. S.*), and Banagher, King's Co.; Mucross, and the Cloonee Lakes, Kerry; Clonbrock, very numerous (*R. E. D.*), Ardrahan, Moycullen (*Miss R.*), Merlin Park, &c., Co. Galway; on the shores of L. Derg, Tipperary, &c.

Lomaspilis marginata, *L.*—Apparently common everywhere, and very variable, some showing the central series of spots confluent, and forming a continuous band, while in others they are obsolete. Var. *pollutaria*, Markree, Sligo; Killynon, Westmeath; Cratloe, near Limerick, Ardtully, Co. Kerry.

(To be continued.)

NEW SPECIES OF SOUTH AMERICAN EUMOLPIDÆ.

By Martin Jacoby, F.E.S.

(Concluded from p. 196.)

Chalcophana fulvocincta, n. sp.

Fulvous; the terminal joints of the antennæ, the abdomen, and the tarsi black; thorax sparingly punctured; elytra bright metallic green, the epipleuræ narrowly fulvous, the punctuation strong and regular in single rows. Length 2½–3 lines.

Head finely but rather closely punctured, fulvous; antennæ long, extending below the middle of the elytra, black, the lower five or six joints fulvous; thorax twice as broad as long, the sides nearly straight, narrowed in front, the anterior angles slightly produced, the surface irregularly but rather distinctly punctured, fulvous; scutellum fulvous; elytra strongly convex, with a slight depression below the base, strongly punctured in closely approached and regular rows, bright metallic green, the epipleuræ fulvous; the breast and the legs fulvous; the abdomen and the tarsi black.

Hab.—Bolivia.

I only know the male of this species, several specimens of which are contained in my collection. It is the only one known to me in which the elytral epipleuræ alone are fulvous and the abdomen black, and will therefore not be difficult to distinguish. Another again closely allied species from the same locality is the following.

CHALCOPHANA OBERTHURI, n. sp.

♀. Rufous; the abdomen and the penultimate tarsal joint black; thorax finely and sparingly punctured; elytra greenish-æneus, closely punctate in single rows, the sides with three costæ of variable length, the lateral margin fulvous, apex dentate. Length 4 lines.

Head rather closely punctured at the vertex only, rufous; antennæ entirely fulvous, the lower six joints shining, the rest opaque; thorax twice as broad as long, the sides slightly rounded at the middle, the anterior angles produced, the disc rather closely, distinctly but irregularly punctured; scutellum rufous; elytra with a shallow depression below the base, the apex of each produced into a short tooth, the surface moderately strongly, closely, and regularly punctured in single rows, the sides with three costæ, the inner one commencing at the shoulder and extending obliquely downwards to the middle, the second much shorter and ending in a line with the preceding one, the third near the lateral margin and continued more or less distinctly towards the apex, the latter portion again strongly raised, the surface of a greenish-æneus colour, the extreme lateral margin and the epipleuræ rufous; abdomen bluish black; the rest of the under side and the legs rufous; the third joint of the tarsi and the claws blackish.

Hab.—Bolivia.

Of this species there are two females before me; in one the antennæ are partly wanting, and I cannot say therefore if their entirely fulvous colour is constant; this is, however, the case in regard to the colour of the tarsi in both specimens and that of the abdomen. *C. peruana*, Har., is certainly very closely allied; but in my specimen of that species (which was obtained by the same collector and at the same locality as the type) the elytra are greenish blue, the antennæ are black with the exception of the lower three joints, and the entire tarsi are of the latter colour, while the elytra are more finely punctured and without the rufous margins or apical teeth.

CHALCOPHANA LONGICORNIS, n. sp.

Rufous; the antennæ (the basal three and the apical two joints excepted), the tibiæ, tarsi, and the abdomen black; elytra dark blue, geminate punctate-striate with slightly convex interstices, their epipleuræ rufous. Length 3 lines.

♀. Head finely and closely punctured, with a short central groove; antennæ as long as the body, black, the basal three and the apical two joints fulvous; thorax about one-half broader than long, the sides strongly rounded, the anterior angles acutely produced in shape of a tooth, the surface very finely and rather closely punctured; scutellum dark fulvous; elytra dark blue, not visibly depressed below the base, strongly punctured in double rows, the interstices in shape of slightly raised longitudinal narrow spaces, the epipleuræ and the extreme lateral margin at the basal and apical portion fulvous; the breast and the femora of the latter colour, the posterior femora with a piceous spot at the posterior portion; the greater part of the tibiæ, the tarsi, and the abdomen black.

Hab.—Amazons.

This is another species having the abdomen black, but differs in the long antennæ and their fulvous apical joints, and in the colour and strong punctuation, arranged in pairs, of the elytra. I possess a single male specimen.

CHALCOPHANA (?) DUODECIMPUNCTATA, n. sp.

Fulvous; the intermediate joints of the antennæ black; thorax very finely punctured; elytra similarly punctate, each with six black spots (2. 2. 2.). ♂. The intermediate tibiæ deeply emarginate at the apex, the latter with a spine. Length 3 lines.

Head, with the exception of a few fine punctures between the eyes, entirely impunctate, the middle with a fovea; antennæ slender, extending to the middle of the elytra, fulvous, the sixth, seventh, and eighth joints black, the fourth joint slightly shorter than either the preceding or following one; thorax rather more than twice as broad as long, the sides angulate at the middle, very narrowly margined, all the angles produced into a tooth, the surface very finely and rather closely punctured, the posterior margin slightly produced and rounded at the middle; scutellum smooth, fulvous; elytra convex, without basal depression, finely punctured in closely approached rather regular rows, each with six round black spots, placed transversely, of which two are placed at the base, two before, and two immediately below the middle; under side and legs paler than the upper surface; the intermediate tibiæ with a deep emargination at the apex, the latter provided with a spine-like process; the first joint of the posterior tarsi nearly as long as the following joints together; claws appendiculate; prosternum deeply bilobed at the base; the first joint of the anterior tarsi very broad.

Hab.—Peru.

The single male specimen contained in my collection scarcely fits into any of the genera placed amongst the *Chalcophanæ*, but agrees best with *Chalcophana* in general shape, that of the thorax and the prosternum, and as the curious tibial structure may only be present in the male, I have thought it best not to erect a new genus on this character alone. *Lamprophæs* has also a slight emargination of the intermediate tibiæ, but differs quite in the shape of the thorax, and the mentioned emargination is nothing like so marked as in the present insect, which would have to be placed in a special genus should other similarly structured species occur.

NOTES AND OBSERVATIONS.

The Sphingidæ of Birmingham and District.—The following is a list of the Sphingidæ which either do occur or have occurred within a radius of twelve miles of the city of Birmingham. It will be noticed that it includes every British species, with the exception of *S. pinastri* and *D. euphorbiæ*, a distinction which few local faunas can boast of. The species marked with an asterisk have been duly recorded in the literature of the time, chiefly the 'Entomologist.'

Acherontia atropos: very intermittent in its appearance; was fairly abundant in the larval stage last year in many localities; otherwise it is only a casual visitor.

**Sphinx convolvuli:* sometimes not uncommon; a larva was once found in a suburb of Birmingham; the imago has been taken at Solihull, Harborne, Kingswood, and elsewhere. *S. ligustri:* plentifully and generally distributed.

Chærocampa porcellus: rare and local; the only locality that I am aware of is Sutton Park (N. Warwickshire). *C. elpenor:* Marsham Green and Northfield, rare; larva has been found feeding on the bedstraw on the canal side near Hockley Heath. **C. celerio:* an example was taken in the centre of Birmingham in October, 1868; in 1880 another occurred about two miles distant. **C. nerii:* this grand insect, the rarest of our Sphinges, was taken in a garden in 1869, not two miles distant from the city. It went into the collection of Mr. Fred. Enock.

**Deilephila galii:* two examples have occurred; one in the centre of Birmingham, and another hovering over honeysuckle at Halesowen, some seven miles distant; both in 1870. **D. livornica* (*lineata*)*:* one near Birmingham and another in a garden at Bromsgrove in 1870.

Smerinthus ocellatus: common. *S. populi:* common. *S. tiliæ:* rather scarce, chiefly as larvæ.

Macroglossa stellatarum: common, but local; occurs every year around Knowle. *M. bombiliformis:* very local; occurs sparingly between Knowle and Hockley Heath, together with *M. fuciformis.*—Augustus D. Imms; "Linthurst," Oxford Road, Moseley, Worcestershire, July 6th, 1897.

Melanism and Climatic Conditions.—Since my criticism on Mr. Harcourt-Bath's paper (*ante*, p. 97) has been thought inadequate, I consider it only fair to that gentleman to enter into a fuller explanation of my meaning. To economise space I will merely recapitulate the chief points of the subject. Mr. Bath argues that melanism was originally adaptive, that is, that dark coloration was beneficial to Lepidoptera procryptically. Melanic varieties, according to his view, originated at low levels for this reason. *Objections.*—(1) There is no reason to suppose that dark coloration, as a general principle, means nonconspicuous coloration in all low-lying country; procryptic coloration, as far as we know, is more special. (2) Our indigenous Lepidoptera tend to darker coloration than continental specimens (see Mr. Weir's remarks, quoted in my first paper); if melanism is procryptically adaptive, continental species would be affected to the same degree as British, &c. (3) Certain insects, inhabiting environs of manufacturing towns, exhibit melanic variations, which become perceptibly commoner with the increase of manufacturing industries. How do we account for this? Lord Walsingham's theory is physically sound and theoretically adequate; and I claim this to be the explanation of that particular phenomenon. How does this affect Mr. Bath's theory? Objections (1) and (2) point to the uncertainty of melanism being procryptically adaptive, but here we have a process going on under our eyes. Therefore I do not think it illogical to presume that the cause which originated melanism is the same as the cause of its rapid increase, when that cause is proportionately augmented.—G. W. Smith; College, Winchester.

Lycæna arion in Gloucestershire.—Readers of the 'Entomologist' will doubtless be pleased to learn that although the area formerly occupied by the "large blue" is sadly diminished, it yet holds its own in one or two localities. My colleague, Mr. J. Mountney, visited the Cotswolds on the 7th and 14th of June, and found it sparingly distributed on the spot discovered by my son three or four years ago. On the earlier date it was just appearing; on the later one, doubtless owing to some rough weather in the interval, was getting rather worn. A most careful search by him on both dates, and by myself on the later one, led us to believe that it is quite extinct in the old "Painswick" district. On my visit there last year none were found, although three were seen in the wood openings between there and Birdlip. None were noticed by us in the last-named locality this season, but we did not work it fairly.—H. W. Marsden; 40, Triangle W., Clifton.

Peronea permutana in Sussex.—I find that I have not hitherto recorded the fact that I bred two specimens of this species from larvæ found on *Rosa spinosissima* near Beachy Head in August, 1888. The specimens are both males, and rather smaller than Wallasey females of the species in my collection; the hind wings are darker.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

Dianthœcia ? luteago var. barretti in Cornwall.—At the meeting of the South London Entomological and Natural History Society, held on July 8th last, Major Ficklin exhibited three specimens of *D. luteago* var. *barretti* which he had recently taken on the Cornish coast. These examples differed from the Irish specimens in having the ground colour grey instead of brownish. As there appears to be some doubt as to the identity of the two previous records, these are probably the first authentic English examples of the species.

Wicken Fen.—We are very pleased to learn that a considerable portion of this notable locality, which for some time had been in the market, has been purchased by gentlemen who are entomologists. This promises well for at least one species of Lepidoptera enumerated in the list of those that should be protected from the danger of extermination.

Uniformity in Setting Lepidoptera.—I can only endorse the Editor's opinion on the above subject (*ante*, p. 175), and Mr. Dannatt will see that I have made the same remarks in regard to anybody's private opinion or taste in setting Lepidoptera. That nothing is more difficult than to introduce reforms or alter preconceived notions, no matter how erroneous, one is more convinced of every day. In any case, the majority of the world's entomologists are of my opinion, and English colleagues will undoubtedly follow their example sooner or later.—M. JACOBY.

THE LEPIDOPTERA OF PORTLAND.—We have not seen the work, but we understand that a list of Portland Lepidoptera, by Mr. N. M. Richardson, has been recently published.

EGGS OF BRITISH LEPIDOPTERA FOR FIGURING.—Mr. E. Wheeler, The Triangle, Clifton, is figuring eggs of British Lepidoptera, and has at the present time drawn the ova of some seventy species. Further progress of the work is rather impeded by lack of material, and he would be glad to receive an egg or two of any species he is in want of.

APPLICATION FOR BRITISH PLATYPEZIDÆ.—I have been studying and describing British Syrphidæ, Pipunculidæ, and Platypezidæ, for the last few years; and while I think I have seen and described nearly all the Syrphidæ and Pipunculidæ, I have lamentably failed in the genus *Platypeza*, and I may even admit that after more than thirty years' collecting I have not seen a good pair of even one species of that genus, though about a dozen species occur in Britain. I possess various good specimens of *Callimyia;* but of *Platypeza*, though I have twenty or thirty *P. modesta*, for instance, I have not seen a single male fit for description. If anybody can send me good specimens of Platypezidæ I shall be glad to see them, and will undertake to quickly return them; and I may say that I would very willingly name any Pipunculidæ, or difficult species of Syrphidæ belonging to such genera as *Chrysogaster* or *Pipiza*.—G. H. VERRALL; Sussex Lodge, Newmarket.

CAPTURES AND FIELD REPORTS.

PLUSIA MONETA IN SURREY.—Last year I recorded the occurrence of *P. moneta* at Weybridge. This year no fewer than fourteen larvæ or cocoons have been found by myself and friends in the same garden in which they were discovered last year, on the leaves of *Delphinium*. It seems as though *P. moneta* had definitively established itself here.—(Rev.) J. E. TARBAT.

PLUSIA MONETA IN SUSSEX.—On June 30th I took two *Plusia moneta* flying over valerian in a garden near Balcombe, Sussex. They were exceedingly fine specimens both in respect of size and condition, and I took them within five minutes of one another about 9.30 p.m. Through the remainder of that evening, and through the two evenings following, I sought diligently, but no more fell to my lot.—SELWYN IMAGE; 6, Southampton Street, Bloomsbury, W.C., July 14th, 1897.

PLUSIA MONETA IN KENT.—My son caught, last night, in my garden here, *Plusia moneta*.—This makes the eighth I have taken in this locality since 1890.—R. A. DALLAS BEECHING; 24, St. James Road, Tunbridge Wells, July 21st, 1897.

Epichnopteryx reticella.—On May 3rd Mr. F. G. Whittle obtained larvæ of this species not uncommonly at Canvey, and Mr. J. J. Walker took one imago at Queenborough on June 6th.

Sphinx pinastri.—Early in June I was much surprised by the emergence, in one of my breeding-cages, of a specimen of *Sphinx pinastri*, and unfortunately I have no precise data as to its origin. As, however, I have no foreign pupæ in my possession, I can only conclude I must have received it from some one here, as I frequently receive larvæ and pupæ found in the neighbourhood. This is a pine country, but I have never heard of *Sphinx pinastri* occurring here.—(Rev.) J. E. Tarbat; Holmlea, Weybridge, July 14th, 1897.

Sesia musciformis (philanthiformis) and Dianthœcia luteago in Carnarvonshire.—When there last year I thought *S. musciformis* must occur, but could not turn it up, as the weather was bad, and I had not found out the favourite kind of thrift; so that I discovered no traces. This year (June 7th) I found pupæ numerous in dead or nearly dead plants on rocks at the very edge of the cliff, and also a good number of imagines. I also took a single specimen of *D. luteago*, var. *barretti*. I sent it to Mr. Barrett to see, thinking he might like to figure it. He pronounces it indubitable, but it was just too late for figuring. I netted it at dusk, June 7th. —F. C. Woodforde; Market Drayton, July 12th, 1897.

Amphidasys betularia *var.* doubledayaria in the London District.—Twenty years ago I took a specimen of the black form of *A. betularia* near Coombe Wood.—W. M. Christy; Watergate, Emsworth, Hants.

Phorodesma pustulata in Middlesex.—I took a nice specimen of *Phorodesma pustulata* (= *bajularia*) here on June 29th. Does this insect often occur in Middlesex?—E. H. Wilde; Clay Hill House, Enfield, June 30th, 1897. [Probably not uncommon in Middlesex. The species used to be fairly plentiful in the Hampstead district, and has been recorded from Mill Hill and Harrow Weald.—Ed.]

Hydrilla palustris, &c., at Wicken.—During Whitsun week at Wicken, whilst working with Morley Houghton, son of the late A. Houghton, we took two specimens of the above, one on June 5th, the other on the 7th. *M. flammea* and *A. albovenosa* were in fine condition, but other insects were not so abundant as usual owing to the lateness of the season.—E. B. Nevinson; 3, Tedworth Square, Chelsea, S.W.

Collecting at Sidmouth, South Devon.—While staying at Sidmouth for a fortnight in June, I was fortunate to come across a colony of *Leucophasia sinapis* on the cliffs. They were very easy to catch, as their flight was very slow, and some kept settling on the flowers. The following butterflies were also abundant:—*Thecla rubi*, *Lycæna bellargus*, *Syrichthus alveolus*, *Hesperia tages*, *H. sylvanus*, *Euchloë cardamines*; while *Argynnis selene* and *A. euphrosyne* swarmed in Harpford Woods. Sugaring was a failure; only *Agrotis exclamationis* and *Xylophasia monoglypha* came in quantity to the bait. On the moors *Bombyx rubi* was very abundant, and I managed to net ten one day. I also took the following:—*Arctia villica* (three), *Emmelesia affinitata* (in splendid condition), *Spilosoma mendica*, *Boarmia repandata*, *Grammesia trilinea* (one variety), *Fidonia atomaria*, *Corycia temerata*, *Orgyia pudibunda*, *Euclidia mi*, *Lithosia aureola*, *Venilia maculata*, *Melanthia ocellata*, *Melanippe montanata*, *Eubolia palumbaria*, and *Smerinthus populi.* Larvæ of *Bombyx neustria* were abundant on brambles; also single larvæ of *B. quercus* and *Odonestis potatoria.*—H. O. Wells; Hurstfield, The Avenue, Gipsy Hill, London, S.E., July 6th.

Entomology in Alderney.—I have recently returned from a three months' sojourn in Alderney (April–June). The weather was windy and very rainy part of the time. Season not an early one this year. I should probably have been more successful had I been able to remain a little later on in the island, especially as regards Sphingidæ (*convolvuli, porcellus, atropos,* which are all, I am given to understand, common there). *Melitæa cinxia* proved my best catch among the butterflies. I discovered its habitat in tolerable abundance, but it is very local. In Hymenoptera and Diptera I was fairly successful; Neuroptera extremely scarce. I obtained one *Phryganea* and one *Chrysopa,* and saw one dragonfly only during the whole of the time. It flew by me over the downs and down a valley in the south-west of the island. I am almost sure it was *L. quadrimaculata.* I append a list of the Alderney insects that I know of for certain. Other kinds of the Coleoptera, Hymenoptera, and Diptera are yet to be named at the British Museum. Anyone wanting Alderney insects, for the sake of the locality, is welcome to my duplicates in return for naming said species, with the view of getting as complete a list of the island fauna as possible. The same remark applies to the Orkney insects that I obtained last year. I got one hymenopterous insect new to my collection, and only saw that one specimen, and never met with it elsewhere; it was resting on the angelica on a hill-side in Alderney. Body particularly long and slender; black, with many yellow stripes.

Rhopalocera.—*P. brassicæ* (fairly common), *P. rapæ* (fairly common), *Polyommatus alexis* (very common), *Satyrus ianira* (very abundant), *S. megæra* (not plentiful), *Vanessa cardui* (one noticed), *V. atalanta* (five or six seen), *V. urticæ* (two seen). The three last-named species are common in the island, I believe, and more were seen by others. *M. cinxia* (common in places, but very local and its range restricted), *C. edusa, C. phlæas* (both seen in case of stuffed birds belonging to a resident, and both common in island).

Heterocera.—*Sphinx convolvuli, D. porcellus, A, atropos, M. stellatarum, Z. filipendulæ, E. jacobææ, Arctia caia, A. menthastri, A. lubricipeda, Pterophorus pentadactylus, Camptogramma bilineata, Mamestra brassicæ, Plusia gamma.*

Hymenoptera.—*Bombus terrestris* (common), *B. lapidarius* (common), *Chrysis ignita* (two caught, two or three more seen), *Odynerus quadratus* (one specimen), *Andrena nigro-ænea ?, A. cineraria, Osmia rufa ?* (common on old walls), *Allantus arcuatus* (a few seen). The cylinders of the leaf-cutting bee, known as the "barrel bee" in Alderney, and believed to belong to the Andrenidæ, are common in the island a little later in the season, but not so abundant as formerly there before the fortifications of Mount Albert were erected on what is known as the Mount.

Coleoptera. — *Calathus melanocephalus, Meloë, Melolontha vulgaris, Timarcha coriaria.*

Neuroptera.—*Phryganea* (one), *Chrysopa* (one).

Diptera.—*Chlorosia formosa, Scatophaga stercoraria, Sarcophaga hæmorrhoidalis, Tipula gigantea, Bibio marci, Eristalis arbustorum, Scæva pyrastri, Calliphora vomitoria.*—(Rev.) F. A. Walker; Cricklewood, N.W., July 20th, 1897.

SOCIETIES.

South London Entomological and Natural History Society.—*June 24th*, 1897.—Mr. R. Adkin, F.E.S., President, in the chair. Mr. W. H. Drury, F.R.H.S., Kingston-on-Thames, and Mr. J. Sandison, Wimbledon, were elected members. Mr. South exhibited the series of *Zygæna filipendulæ* taken in Middlesex, and referred to at length in Entom. for July. He was unable to draw any fine distinction between var. *hippocrepidis* and the type, and remarked that it was necessary that considerable attention should be paid to the Zygænas before any certainty could be expressed as to the specific value of the various forms. Mr. Adkin, series of *Cyaniris* (*Lycæna*) *argiolus* bred from ova and larvæ taken last autumn at Eastbourne (Proc. S. Lond. Ent. Soc. 1896, p. 110), and contributed notes.

July 8th.—Mr. R. Adkin, The President in the chair. Mr. A. Perry, Anerley, was elected a member. Mr. Lucas exhibited nymph cases of *Anax formosus* taken by himself and Mr. W. Prest at the Black Pond, Esher, in June. Mr. Auld, a fine bred series of *Phorodesma bajularia* from the New Forest. Mr. Malcolm Burr, a small collection of Orthoptera from the Persian Gulf, collected by Mr. J. H. Hiles; they were chiefly European species (see Entom. July). Mr. Ficklin, three specimens of *Dianthæcia luteago* var. *barretti* from Cornwall this year. They were very different from the Irish form, being grey in colour. This was interesting as being the first well-authenticated occurrence of the species in England. Mr. Mera, a bred series of *Hadena dissimilis* (*suasa*) from Essex, including a specimen having all the markings converted into longitudinal streaks. Mr. Turner, a bred series of *Cleora lichenaria* from Ashdown Forest, and series of several species of Coleoptera, including *Strangalia melanura* from Ranmore Common, *Cionus scrophalariæ* from Chalfont Road, and *Leptura livida* from Canvey Island. Mr. Robt. Adkin, series of *Eupithecia satyrata* var. *curzoni* bred from Shetland larvæ, and contributed notes.—Hy. J. Turner, *Hon. Report. Sec.*

North London Natural History Society.—On Friday, June 4th, 1897, members of this Society started for their annual Whitsuntide excursion to the New Forest. The majority of the party left Waterloo by the 6 p.m. train, and reached Lyndhurst about ten, the journey being an unusually long one. Mr. C. B. Smith, who was in command of the excursion, was unable to get down till the following day.

Saturday broke dull, with signs of rain, but, with their usual heedlessness of weather, several of the North Londoners were early astir, and larva-beating in Beechen Lane was tried with, alas! even less success than usual. Scarcely anything worth taking in this line seemed to be about, though the commoner sorts were plentiful enough. For once in a way, *Hybernia defoliaria* was not the commonest larva, that honour being about evenly divided between *H. marginaria* and *H. aurantiaria*. *H. defoliaria* had probably mostly gone down. Of imagines, there were found a few *Pechypogon barbalis*, *Iodis lactearia*, *Acidalia remutaria*, and one *A. straminata*. The fences only yielded a fine specimen of *Hadena genistæ* to Mr. Woodward. Being unsuccessful with larvæ, the party returned to quarters for breakfast.

About ten o'clock the weather turned out fine, and eventually became broiling hot. Though Mr. C. B. Smith was unable to be present in person, he had left an excellent programme of arrangements, the first part of which consisted of a visit to the Knightwood Oak. Accordingly, soon after breakfast, with the exception of Messrs. Harvey and Woodward, who preferred to go to Rhinefield, and the two Messrs. Smith, who had not yet arrived, the party started for the celebrated giant, though, as will be seen later on, nearly all failed to get there. Mr. L. J. Tremayne opened his entomological account with a superb little specimen of *Acidalia trigeminata*, and Mr. C. Nicholson found a field where *Euchloë cardamines* was on the wing. Proceeding, it became evident that *Pararge egeria*, in all conditions, was also flying, *Gonepteryx rhamni* was depositing, and in some cases courting. *Argynnis euphrosyne*, apparently not fully out, was seldom to be seen more than one at a time, and several of the commoner Geometræ were to be had by beating. An insect which appeared to be in greater abundance than usual was *Formica rufa*. The route taken being *viâ* Bank, the party soon entered Gritnam Wood, where larva-beating was once more tried. Presently *Tæniocampa miniosa* and full-fed *Thecla quercus*, together with a few *Psilura monacha*, began to come down. Mr. Jennings also met with some success in the Diptera, Hymenoptera, and Coleoptera. Before reaching the Lymington river, a halt was called, as it was found impossible for the ladies to continue in the heat of the sun, whereupon they, with Mr. Nicholson, senior, decided to abandon the walk. Messrs. Bacot, Bishop, and Jennings, finding collecting improving, decided to remain more or less where they were, and Messrs. C. Nicholson and L. J. Tremayne were left to push on to the Knightwood Oak alone. They first turned into Rhinefield, where the President took a fine specimen of *Macroglossa bombyliformis*, but no more were seen; another collector on the ground stated that he had been there the whole morning, and only taken three, of which one was worn. The President and Secretary subsequently, with some difficulty, succeeded in making the Knightwood Oak, the girth of which was measured and found to be 6 yards 2 feet 3 inches. But the tree is tall in proportion to its thickness, and has rather a slender appearance than otherwise from a distance. The wanderers subsequently proceeded through Mark Ash and Boldrewood, and home by the Ringwood Road *viâ* Emery Down. Messrs. Bacot and Bishop had obtained larvæ of *Asphalia ridens* and *Nyssia hispidaria*. Messrs. Harvey and Woodward, who had been at Rhinefield, had succeeded in capturing both the "bee hawks," and had turned up *Tanagra atrata* and larvæ of *Bombyx quercus*. Messrs. Jennings, Bacot, and Bishop had been attacked on the Christchurch Road by a species of *Tabanus*, which resembled *autumnalis*, but which Mr. Jennings thought must be a different species, as the specimens were worn. After tea some of the members started for evening work. To begin with, Mr. C. Nicholson knocked down a flying specimen of *Asemum striatum* in the garden, and this was one of the very best captures made during the visit. Up to the year 1893 this species had never been found in the south of England, being essentially a northern species, though occurring in a certain locality in Cumberland. At Whitsuntide, 1893, a single specimen was taken in the New Forest by

Mr. Bertram Rye, who again met with it in 1895, when he captured two specimens at Bookham, Surrey. It is, like all the Longicorns, a wood borer, and is attached to pine and fir. How it had been introduced from Scotland to the south of England, Mr. Jennings could not imagine. After this interesting capture, Messrs. C. Nicholson, L. J. Tremayne, Bacot, Bishop, W. H. Smith, with Miss Nicholson and Miss Bacot, made for Hurst Wood. Scarcely anything flew at dusk, a few *Melanippe montanata* being about the only captures, though New Park was tried as being better ground. Sugar also was an utter failure, not attracting a single lepidopteron. Larva-beating produced a few *Asphalia ridens*, *Thecla quercus*, and *Psilura monacha*. Messrs. Harvey and Woodward, however, were successful in taking *Scodiona belgiaria* on Whitemoor. Mr. C. B. Smith arrived at supper time.

A trip to Beaulieu had been arranged for Sunday, but as the day was again intensely hot, the members decided not to go so far; but a collecting party consisting of Messrs. C. B. Smith, Harvey, Bacot, Woodward, and Bishop left Lynwood after breakfast for Beechen Lane. Mr. Bishop brought out a specimen of *Epione advenaria*, and Mr. Bacot one of *Gnophria rubricollis*. *Bombyx rubi* was found commonly on the heath near Denny Bog, as well as a few *Saturnia carpini*. Mr. Woodward also took *Lithosia mesomella* and *Gnophria rubricollis*. The larvæ beaten were *Tæniocampa miniosa*, *Asphalia ridens* (a few), *Thecla quercus*, *Amphidasys strataria*, and *Psilura monacha*. The party remained out the best part of the day, and returned by the Beaulieu Road, picking up some more *Scodiona belgiaria* on Whitemoor. Mr. C. B. Smith had previously returned to dinner, and in the afternoon he and Mr. L. J. Tremayne sauntered down to the "Bombyx" heath and took several *B. rubi*, and coming back the Vice-President took a fine specimen of *Eupithecia togata* from a fence. Meanwhile Messrs. Jennings and W. H. Smith had spent the day at Rhinefield, and taken six specimens of *Macroglossa bombyliformis*. They also found several species of large Syrphidæ in numbers at the rhododendron blossoms. Amongst them were *Sericomyia borealis*, *Criorrhina oxyacanthæ*, *Volucella bombylans* var. *plumata*, and *Myiatropa florea*. *S. borealis* much resembles a wasp both in its markings and in its manner of flight, and when caught produces a loud humming noise by the vibration of the halteres, and which resembles in miniature the crying of a child. A single specimen of *Conops vescularis* was seen, but unfortunately escaped. On the way home Mr. W. H. Smith took one *Metrocampa margaritaria*, one *Geometra vernaria*, and one larva of *Catocala sponsa* beaten from an oak close to Clay Hill. The larvæ of *Diloba cœruleocephala* and *Nola cucullatella* were abundant on the banks of the Lymington river, and in Hurst Wood Mr. Jennings saw a female of *Dioctria œlandica*, one of the predatory Diptera, with its prey in its jaws. Beechen Lane and Whitemoor were the scenes of the evening work. Sugar was as useless as the previous night, and dusking only slightly improved.

On Monday, Mr. C. B. Smith, Mr. Nicholson, senior, and all the ladies except Miss Saunders, elected to drive to Rufus Stone. Miss Saunders spent the day collecting ferns in Pond Head and Jones's Enclosures and Beechen Lane. The rest of the party started for Matley Bog *viâ* Whitemoor. For Lepidoptera this was the best day of the trip. The alder swamps in Matley Bog yielded *Hydrelia uncula*, *Eupisteria heparata*, *Hypsipetes impluviata*, and one *Erastria fasciana;* while *Aspilates strigillaria* occurred not uncommonly on the heaths, and *Drepana falcataria* was found among the birch. Mr. Jennings met with the only good weevil taken during the trip, a specimen of *Erirrhinus bimaculatus*, and also the best species of Diptera taken, *viz.* a male of *Spilomyia speciosia*, boxed from the side of the brook running through Matley Bog. This gentleman also obtained a female of *Merodon equestris* (Syrphidæ), which Mr. Nicholson had taken at flowers in the Lynwood garden. This is an introduced species, having been brought to England in bulbs, in which the larvæ feed. It is now well established in this country. The party returned home early, and after tea returned by the 7 o'clock train to town. Mr. Jennings reports the following species, other than Lepidoptera, taken during the trip in addition to those already mentioned:—Geodephaga (ground beetles), *Calosoma inquisitor* (two beaten from oaks, and one each from hazel, beech, and hawthorn), *Abax striola* (one under log on a heath), *Harpalus rubripes* (one, ditto), *Dromius 4-maculatus* (one), and one species each of *Pterostichus*, *Notiophilus*, *Harpalus*, *Calathus*, not yet named; Brachelytra (rove beetles), *Creophilus maxillosus* (one under a dead rabbit on Whitemoor); Necrophaga (burying beetles), *Silpha 4-punctata* (beaten commonly from oaks), *S. rugosa* (one), *S. sinuata* (several obtained from the before-mentioned dead rabbit), *Saprinus* (two unnamed species from the same source); Lamellicornia, *Geotrupes vernalis* (one on Whitemoor), *Trox sabulosus* (one under an old rag at a spot where there had evidently been a gipsy encampment), *Melolontha vulgaris* (several beaten from oaks), *Phyllopertha horticola* (four in various situations), *Leucanus cervus* (several); Elateridæ (click beetles), *Campylus linearis* (one out of hawthorn), *Colymbetes holosericeus* (common on oaks); Malacodermata, *Dolichosoma nobile* (one from aspen); Longicornia, *Anoplodera sex-guttata* (one on a wall), *Rhagium bifasciatum* (three), *R. inquisitor* (one at sugar in Jones's Enclosure), *Clytus arietis* (two on dead wood), *Toxotus meridianus* (one netted flying near the Lymington river at Rhinefield), *Strangalia nigra* (three from Matley Bog); Phytophaga, *Clythra quadripunctata* (one taken by Mr. Bacot at Denny), *Cryptocephalus lineola* (one from heather on Whitemoor), *Adimonia capreæ* (several), *Phytodecta viminalis* (several); Heteromera, *Lagria hirta* (one out of an oak in Hurst Wood); Rhyncophora (weevils), *Attelabus curculionoides* (two out of oaks), *Rhynchites pubescens* (several out of oaks), *Otiorrhynchus picipes* (several from hawthorn), *Strophosomus coryli* (common on anything but hazel), *Hylobius abietis* (three), *Erirrhinus tortrix* (two from aspen), *E. maculatus* (several from aspen), *Balaninus glandium* (one beaten from oak); Diptera, *Bombylius major* (one in a most dilapidated condition, having half of the wings gone, and very ragged pubescence); Hemiptera-Heteroptera, *Acanthosoma* (three specimens of a species beaten from hawthorn); a yellow species was common on oaks, and a fine green Capsid was beaten from hawthorn at Rhinefield; Hymenoptera, Tenthredinidæ, *Tenthredo maculata* (one specimen taken by Mr. Harvey near Brockenhurst).—LAWRENCE J. TREMAYNE, *Hon. Sec.*

RECENT LITERATURE.

A Study in Insect Parasitism: a Consideration of the Parasites of the White-marked Tussock Moth, with an Account of their Habits and Interrelations, and with Descriptions of New Species. By L. O. Howard. 58 pp., illustrated. Washington. 1897.

The host referred to in this interesting pamphlet is *Orgyia leucostigma*, a very close ally of *O. antiqua*, which in the United States is destructive to shade trees in cities. The author points out that, after the introduction of the English sparrow into the States, the *Orgyia* became more numerous, whilst "cankerworms," which had previously been the chief destroyers of the foliage of shade trees, were practically exterminated. In 1895 the *Orgyia* increased to an alarming extent in the city of Washington, and the author was afforded an opportunity of investigating its life-history, more especially with regard to the "prominent part which parasites take in the reduction of an insect which under favourable conditions has exceeded its normal bounds in respect to numbers." That the parasites, chiefly *Pimpla inquisitor* and *Chalcis ovata*, were doing good service is shown from the fact that at the end of August and early part of September in the year mentioned, when the *Orgyia* larvæ were most abundant, "it was an exception to find a healthy caterpillar which one of the parasites was not engaged in stinging. The rearings which were undertaken at this time show parasitism of perhaps 90 per cent. of the caterpillars." In June, 1896, "it was a very difficult matter to find enough living individuals to carry on rearing-cage experiments at the very points where they had been present the previous year by thousands and thousands," and the parasitism had reached to something above 98 per cent.

There are twenty-four original illustrations in the text.

Harrow Butterflies and Moths. Vol. II. By J. L. Bontrote, M.B.O.U., and Hon. M. C. Rothschild, F.E.S., F.Z.S. Pp. i–x, 1–112. Harrow: J. C. Wilbee. 1897.

Continues the list of Lepidoptera occurring in the Harrow district from Uropterygidæ to Alucitidæ. In the present volume there are introductory notes to some of the families and genera. There is also a supplement to Vol. I., containing additions and corrections; altogether 469 species are noticed as occurring, or having occurred, in the area dealt with.

Obituary.—We learn with regret that Mr. John Finlay, of Morpeth, died on July 4th last, at the age of sixty-one years. His interest in entomology was chiefly confined to Lepidoptera, of which order he had formed a fine collection. For upwards of thirty years he had occupied the post of head gardener at Meldon Park.

THE ENTOMOLOGIST

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THE PROTECTION OF LEPIDOPTERA.

The Entomological Society of London has entered on its work of attempting to control the too assiduous collector with commendable thoroughness; but the Protection Committee is hardly likely to propose such extreme measures as those suggested by Mr. Harold Hodge in an article on this subject in the 'Saturday Review' (July 17th). "I am not disloyal," writes Mr. Hodge, "to the entomological brotherhood; I am, and I wish to be considered, one of them; but I admit I prefer the butterflies to the entomologists." The writer then proceeds to unfold his plans for checkmating the "omnivorous collector." He says:—

"Entomologists are organised; the Entomological Society of London, as the natural head of all such societies, can declare a close season, and announce the species to which the close season is to apply. They can condemn the purchase of British insects in any stage of life from dealers. They can suspend collecting in particular localities for a specified period of time. They could, for instance, declare that there should be no collecting of the butterfly *Papilio machaon* in the egg, larva, pupa, or imago in, say, Wicken Fen for three years. It is for species whose habit is to cling to the same spot from year to year without spreading that protection is especially needed; such species, while scarce in the country generally, are plentiful where they do occur. They are thus easily grabbed by the collector, while they excite his cupidity from being, in insect-hunting parlance, 'good.' There would be no difficulty in making known the Society's edicts to the entomological world. Most collectors take in some entomological journal, or belong to some society. 'Yes; but, your rules made, promulgated, and understood, how are you to enforce them? Where is your sanction? What is the use of making rules when you can neither compel obedience nor punish disobedience?' This difficulty would perhaps be fatal if the whole body of collectors were utterly reprobate. Happily they are not; and I believe that a large number would be strictly loyal, and the majority more or less loyal, to the decisions of the Entomological Society. This in itself would be a gain, and would rapidly create a strong public opinion. And for the recalcitrants, the reprobates, it would be the business of the loyal entomologist resolutely to take them in hand. The head Society would keep and publish a black list of offenders; it would be the plainest duty of every respectable collector to give the Society information of any offence against the code. Proved offenders would be expelled from all societies; they would be debarred from 'exchange'; they would be excluded from the pages of all entomological journals. To an entomologist this would be no light sentence. Dealers could easily be tackled. They are not, in my view, nearly so much to blame as amateur collectors, but their depredations are too serious to be passed over. Any professional 'naturalist' that sold British butterflies and moths in any stage, alive or dead, during the close season, would be placed under the ban of the Entomological Society; and collectors would be instructed not to deal with him for any purposes. (This would not, I hope, bring the officers of the Society within the law against boycotting, or make them guilty conspirators.)"

The following extract is from a paper entitled "Preservation of Rare British Animals," by Mr. John T. Carrington ('Science Gossip' for August):—

"In every division of nature and in every region of the earth there appear to be waves in the abundance and scarcity of certain species of the feral inhabitants. Returning to those of Britain, we may consider one of the most studied and best understood of the great orders—that of the Lepidoptera, or butterflies and moths. In my own time of active observation, extending to nearly forty years, we have known some species in many parts of the country which were generally common, or at least by no means rare, to have practically disappeared. As an example I may mention the 'brown-tail moth' (*Porthesia* (*Liparis*) *chrysorrhœa*), which twenty years since was a comparatively common species throughout the South of England, but is now rarely or hardly ever found. The same applies to that handsome butterfly the 'black-veined white' (*Aporia cratægi*), which was abundant half a century ago throughout southern England and South Wales. Without mentioning others, these two instances are sufficient to prove that some other agency than that of the collector must have caused their disappearance; because, in the first place, there have never been in this country a sufficient number of persons who required specimens of these once common species to have exterminated them. Neither have some of the localities where they both abounded ever been visited by entomologist or collector. I have every sympathy with those who have founded societies for the protection of our wild birds, and brought about Acts of Parliament for their preservation. As I have said earlier in these lines, I look with abhorrence on the useless, senseless, and vulgar destruction of any kind of wild life. I admire equally the efforts which certain collectors of butterflies and moths have been making for the formation of an association to protect disappearing species in our fauna. Doubtless their efforts may prolong for a few years the stay of these species with us; but if their diminution is due to the forces of nature or to their inadaptability to accommodate themselves to human civilisation, no amount of dilettante preservation will stop their ultimate extinction. While forming these societies and advocating the abstention from collecting, humanitarians must be careful not to allow sentimental feelings to interfere with the proper acquisition of representatives of our fauna for scientific purposes. I venture, however, to hold the opinion that at no time has scientific collection caused the extinction of any species."

Everyone will agree with Mr. Carrington that the naturalist must not be denied a free hand in acquiring specimens for study; but there does not seem to be any reason to apprehend that anyone desires to interfere with him, or yet with the collector of moths and butterflies who merely wishes to complete his series of these insects. It has been considered desirable, however, that some local species of Lepidoptera should not be "worked" so closely and persistently as they have been, as the continuance of such a course may tend, it is thought, to hasten their extinction in this country, an event, by the way, which in some instances appears likely enough to occur from causes (possibly natural) about which we at present know very little indeed. Those entomologists, therefore, who have local species within their areas of observation, are asked to do all they can to foster such species, and we do not for one moment doubt that they will do so.

It will never be necessary to put in operation the pains and penalties which Mr. Hodge would mete out to the contumacious, because entomologists are quite able to effectually deal with a refractory member of the community without resorting to exceptional measures. They have been successful in the past in defeating the cunningly-devised plans of the vendor or exchanger of spurious British insects and manufactured varieties; and now that moderation in collecting local species is recognised as a prudent course, they will find means to enforce its adoption whenever or wherever the occasion arises.

THE PROTECTION OF INSECTS IN DANGER OF EXTERMINATION.

By Robert Adkin, F.E.S.

The task undertaken by the "Committee for the protection of insects in danger of extermination" is of so delicate a nature that one is somewhat diffident in making any comment upon any part of its proceedings, and it must not be thought from what I am about to say that I am not entirely in sympathy with the broad principles of the good work that it has in hand. For my own part, however, I would much rather that the list of species supposed to need special protection had not been published, as I cannot help thinking that the power of the Committee would be much more felt by collectors if its views were pressed home to them in a general way, and the question of the particular species needing such protection left to the good sense and experience of the individual. If, however, such a list was deemed to be a necessity, would it not have been well to have confined it to the narrowest possible limits, and not to have included in it the names of any species whose sporadic appearance tends to show the possibility of their decreased numbers or actual disappearance to be the result of natural causes rather than the act of man? I take it that the scope of the Committee's work would not extend beyond the latter proposition.

Without wishing to enter into any general criticism of the list already published (*ante*, p. 198), many of the species included in which would, I doubt not, appeal for protection from extermination to any thoughtful collector, whether specially indicated or not, I would mention, by way of illustrating my point, two species, my experience of which leads me to believe that their extermination by "over collecting" would be a simple impossibility. In July, 1875, I was at Deal, and shall never forget the abundance of pupæ of *Porthesia chrysorrhœa* that I then met with; the hawthorn hedges in the country lanes, the brambles by the wayside, even the sea-buckthorns on the sand-hills, were full of them; they might be pulled out of the hedges in bunches of half a dozen at a time, and it was no uncommon thing to find three or four spun up in a single bramble-leaf. Had I been so minded, I could literally have collected the proverbial waggon load. Some six years later I again visited the same locality at the same time of year, and should have been glad to have renewed my acquaintance with the species, and in fact made a special journey to the hedges where I had previously found it so abundant, but failed to find it; nor did the sea-buckthorns on the sand-hills prove any more productive, although I was frequently among them for fully a fortnight. About the same time that the species was so abundant at Deal, it was also common in the Higham district, and apparently disappeared at about the same time as in the former district, although its congener, *Porthesia similis* (*auriflua*) still continued to occur much in the same numbers as formerly. *Clisiocampa castrensis* is another species which, although having a much more restricted range, probably on account of the peculiar situations which it affects and the distribution of its usual food-plant, is also liable to seasons of extreme abundance and scarcity. In the marshes on the north bank of the Thames I have seen the larvæ of this species in all stages in the utmost profusion; yet a few years later a diligent search would not be rewarded by a single example, and such a phenomenon has occurred more than once within my own recollection. It is unnecessary here to discuss the probable causes of the apparently sudden abundance and equally rapid scarcity or disappearance, as that does not come within the present question; but it appears to me that such changes could not possibly have been brought about by any amount of collecting, or indeed by any contingency within man's control. Questions such as these species have raised in my own mind will doubtless occur to the minds of entomologists with regard to some other of the species mentioned in the list, and I fear will not tend to strengthen the hands of the Committee in the task that is before them; but although any attempts to enforce hard and fast rules may lead to unlooked-for difficulties, a vast amount of good may, I doubt not, be done in the desired direction by moral persuasion.

Lewisham, August, 1897.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 216.)

Hybernia rupicapraria, *Hb.*—Common in most districts. Of its distribution, however, I have but scanty positive evidence, as its season of flight is so early that it escapes notice in a country which has but few entomological observers. The few localities I give, however, indicate the probability of its being widely spread. Killynon, Westmeath (*Miss R.*); in the North at Belfast (*W.*); abundant near Derry (*C.*); common at Drumreaske and elsewhere in the Co. Monaghan; on the east coast at Castle Bellingham (*Thornhill*), and near Dublin; and it abounds at Clonbrock, Co. Galway (*R. E. D.*).

[Hybernia leucophæaria, *Schiff.*—This insect is recorded in Birchall's list as common, but I have seen no Irish specimen, though it has been stated to occur at Waterford; of which confirmation is desirable.]

Hybernia aurantiaria, *Esp.*—Apparently rare. Drumreaske, Monaghan; Favour Royal, Tyrone; Clonbrock, Co. Galway (*R. E. D.*).

Hybernia marginaria, *Bork.*—Widely distributed and common in most localities. It varies much in markings. A brown aberration, not so dark as var. *fuscata*, occurs at Mount Bellew, Co. Galway. A very dark bordered form is frequent near Enniskillen and Drumreaske. Clonbrock, common; Leenane, over 1300 ft. above sea-level, Co. Galway; Killynon, Westmeath; Favour Royal, Tyrone, very abundant; Armagh (*J.*); Castle Bellingham (*Thornhill*); Enniskillen; Markree Castle, Sligo, &c.

Hybernia defoliaria, *Clerck.*—Apparently widely spread, but I know little of its distribution in the South of Ireland. Abundant at Killarney, and at Mallow, Co. Cork (*Stawell*); Clonbrock, strongly marked forms (*R. E. D.*), and near Galway (*A.*); Pontoon and Enniscoe, on the shores of Lough Conn, Mayo, abundant; also at Mote Park, Roscommon; Derry, fairly common (*C.*); Glenarm (Brunton, Ent. vii. 43), and Ballycastle, where handsome banded forms occur, Co. Antrim; at Rockabill Lighthouse, three miles off shore, it came to the light; and at Howth suffused ruddy brown specimens occur, and others with strongly marked bands and spotted outer margins; Wooden Bridge, Wicklow (*M. F.*); Enniskillen (*A.*).

Anisopteryx æscularia, *Schiff.*—Everywhere spread, and often numerous.

Cheimatobia brumata, *L.*—Abundant universally.

Cheimatobia boreata, *Hb.*—Clonbrock, numerous (*R. E. D.*); Drumreaske, one pupa taken by Mr. Thornhill.

Oporabia dilutata, *Bork.*—Very numerous everywhere. Handsome banded forms occur at Killarney and elsewhere; also the var. *obscurata*, Staud.

Oporabia filigrammaria, *H. S.*—Limerick (*S.*); Clonbrock (*R. E. D.*), one, Leenane and Aasleagh abundant (*Chapman*, E. M. M. xxv. 213), Co. Galway; Magilligan (*R. C.*), and at Kilderry (*C.*), Co. Derry; Belfast hills (*W.*; see following species).

Oporabia autumnaria, *Gn.*—Mr. Watts sent a series of Oporabias from the hills near Belfast to Mr. Barrett for identification, who selected certain small narrow-winged specimens as being similar to the Lancashire and Yorkshire *O. filigrammaria*. Others from wooded slopes at a lower elevation he was of opinion were probably Guenée's *O. autumnaria*.

Larentia didymata, *L.*—Very common and variable. Males from the black basaltic cliffs of Antrim near Ballycastle I have noticed to be extremely dark, though the females are of the normal pale form.

Larentia multistrigaria, *Haw.*—Very generally distributed throughout Ireland wherever *Galium saxatile* is plentiful. At Howth (where I have taken this species in numbers in the first half of February), and at Clonbrock, &c., the males often show basal and central bands across the fore wing like the female. Co. Dublin and Wicklow; Westmeath, at Cromlyn (*Mrs. B.*), Killynon (*Miss R.*), &c.; Altadiawan, Co. Tyrone; Co. Derry (*C.*); Ballycastle, and the Belfast hills (*W.*). Plentiful in the South of Ireland generally.

Larentia cæsiata, *Lang.*—Exists throughout the mountain tracts of Ireland, varying much. I have, however, nowhere met with such melanic forms as those from Yorkshire, the grey inconspicuous type chiefly predominating. Like *L. didymata*, I have noticed that in rocky localities the species conforms somewhat to the tone of the rock formation. In the S.E. of Kerry a very unicolorous grey form is found on the slate formation, but on the limestone cliffs of Clare a very pale one.

Larentia salicata, *Hb.* — Local, but existing in all four provinces. In some places, as at Powerscourt, Wicklow, plentiful in the May emergence. I have (perhaps accidentally) only met with occasional specimens in the late summer. Besides the pale form with well-defined pattern, sometimes showing a well-defined central band, dark at the borders, but pale round the discoidal spot, there is a dark suffused form (var. *unicolorata*, Gregson). The former is frequent at Altadiawan, Co. Tyrone, and on the Belfast hills, where the latter also occurs (*W.*), and at Clonbrock. Galway (*Wallace*), Merlin Park, Clonbrock, Kilcornan (*B.*), Ardrahan (*Miss N.*), &c.; near Crossmolina, Mayo, very common (*S. R. F.*); Markree, Sligo; near Donegal; Magilligan, Co. Derry, suffused with yellow (*Salvage*); Ballycastle, Larne, &c., Co. Antrim (*W.*); Churchill and Armagh (*J.*); Castle Bellingham, Co. Louth (*Thornhill*); Co. Tyrone; Greystones, Arklow, and on the mountain above Powerscourt, Co. Wicklow; Kinsale, Co. Cork.

Larentia olivata, *Bork.*—Apparently very local. Glengarriff, Co. Antrim, numerous (*W.*); Buncrana, Co. Donegal, a few (*C.*); Rockwood, Sligo (*R.*); Clonbrock, Co. Galway, one (*R. E. D.*); Knock Ion, Westmeath, abundant (*Miss R.*); Powerscourt, Co. Wicklow (*C. G. B.*); Bandon, Co. Cork (*L.*).

Larentia viridaria, *Fb.*—Generally distributed and plentiful.

Emmelesia affinitata, *St.*—Local and not numerous. I have an aberration from Altadiawan, Co. Tyrone, in which the whitish sinuate band of the fore wings is of a ferruginous tint near the costa, but becomes obsolete toward the inner margin. A smoky form with obsolete band (ab. *unicolorata*, Gregson) occurs at Magilligan, Co. Derry (*R. C.*). Farnham, Co. Cavan; Favour Royal, Co. Tyrone; Cookesborough, Co. Westmeath; Hollybrook, near Boyle (*Miss ff.*); Inishowen (*W. E. H.*) and Drumawen (*G. V. H.*), Co. Donegal; Sligo (*R.*); Dalyston and Clonbrock, Co. Galway.

EMMELESIA ALCHEMILLATA, *L.*—Local like the preceding, but sometimes abundant. Killynon, Westmeath (*Miss R.*); Favour Royal, Co. Tyrone; Tempo Manor near Enniskillen, abundant (*Langham*); Athlone (*Wilcox*), Clonbrock, Dalyston, and Recess, Co. Galway; Ballycastle, Co. Antrim; Derry, abundant (*C.*); Ardara (*J.*), and Inishowen, Co. Donegal; Sligo (*R.*), abundant; Bryansford, Mourne Mountains (*W.*); Clogher Head, Co. Louth; Killarney.

EMMELESIA ALBULATA, *Schiff.*—Abundant throughout Ireland wherever the food-plant flourishes; varying from an almost unicolorous greyish white form (var. *griseata*) to strongly banded ones with varied tones of grey ground. This is one of the Geometers which come to sugar.

EMMELESIA DECOLORATA, *Hb.*—Very local. I have never taken any Irish examples. Near Belvoir Park, Belfast (*Bw.*); Magilligan, Co. Derry, a very rich form (*R. C.*); Torc, Killarney.

EMMELESIA TÆNIATA, *St.*—This interesting local species has, I believe, a much more wide distribution than is indicated by our present information. It is likely to turn up in most districts in which relics of old forest survive. Numerous in a few places like Killarney, but notoriously difficult to procure in fair condition. It varies much in size, suggesting difficulty in procuring a regular food supply, or contingent on larval hybernation. It frequents hedges or foliage on the sunny side of woods or open glades, whence it can be beaten on hot days. The median band of the fore wing varies in breadth, sometimes being narrow and very dark, with the elbowed line only slightly angulated near the costa. A curious specimen was taken by Mr. Watts in Donard demesne, Mourne Mountains, Co. Down. Of large size, with uniform buff ground colour, like that of *Anticlea badiata*, all over the fore wing, traversed by a narrow dark central band, the edges of which were not defined with the usual pale strigæ. Beside the above localities, it occurs not infrequently at Favour Royal and Altadiawan, Co. Tyrone; Rockwood, Sligo; and Belvoir Park, Belfast (*Bw.*).

EMMELESIA UNIFASCIATA, *Haw.* — Kingstown (*Greene*), and

Howth (*G. V. H.*), Co. Dublin; Castle Bellingham, Co. Louth, occasional (*Thornhill*); Derry (*C.*).

Emmelesia minorata, *Tr.* — Mourne Mountains, very local (*B.*); Clonbrock, Co. Galway, four specimens (*R. E. D.*).

Emmelesia adæquata, *Bork.* — Widely spread throughout Kerry and Galway. Glengariff, Kenmare, Cloonee L., and Killarney, Kerry; Kilcornan (*B.*), Ballinahinch, Kylemore, Aasleagh, Ardrahan, and Roundstone (*Lt. Walker*), Co. Galway.

Eupithecia venosata, *Fb.*—Generally distributed; very common at Howth, where a very light form prevails. At Clonbrock, Mr. Dillon has met with a darkish form. At Glandore, Co. Cork, Mr. C. Donovan took numerous specimens of the smoky form similar to those from the Orkneys and Shetland, but devoid of whitish lines; and from a larva taken near Ardrahan, Co. Galway, I bred a blackish brown unicolorous specimen without any reticulated pattern, except on the costa. These melanic variations of *E. venosata* therefore do not appear to be connected with insular segregation, but to be local varieties.

[Eupithecia linariata, *Fb.* — Birchall reported a specimen from Howth, but as the food-plant is not indigenous there, though common in districts in the South of Ireland, it may perhaps have been a small specimen of *E. pulchellata.*]

Eupithecia pulchellata, *St.*—In many parts of Ireland, and sometimes emerges in autumn, but is disappointing to breed owing to the large proportion of larvæ stung by ichneumons. Kingstown (*Greene*), Howth? (*B.*), Co. Dublin; Castletownsend, and Cork (*S.*); near Ardtully and Killarney Upper Lake, Co. Kerry; Clonbrock, Co. Galway (*R. E. D.*); Knocknarea, Sligo (*Russ*); Cloghan near Stranolar, Co. Donegal, abundant; near Derry (*C.*); Altadiawan, Co. Tyrone; Errigal, Co. Monaghan; Tempo Manor, Enniskillen (*Langham*).

Eupithecia oblongata, *Thnb.*—Widely spread and common. The ground colour of some specimens is slightly yellowish.

Eupithecia succentaureata, *L.* — Decidedly local, and restricted to narrow bounds, and somewhat scarce where found. Howth (*B.*), near the coastguard station on Lambay Island I have found it in some numbers, Co. Dublin; Castle Bellingham, Co. Louth (*Thornhill*), scarce; Armagh (*J.*).

Eupithecia subfulvata, *Haw.*—Mr. Birchall seems to have met with it in many localities. I know it only from the east coast, at Arklow, Co. Wicklow; near Dublin and Balbriggan; Clogher Head and Castle Bellingham, Co. Louth.

Eupithecia scabiosata, *Bork.* — Apparently a local insect, sometimes pretty numerous. Widely spread throughout the county of Galway, and probably in similar districts of Clare. All the specimens I have seen from Galway are of the pale type, with washed-out pattern. "Taken near Galway in June in some numbers in corners of rough pasture fields in mixed herbage" (*Birchall*, Entom. iii. 192); also by Mr. Allen. Kilcornan, common (*B.*), Ardrahan, common, Kylemore (*Hon. Emily Lawless*), Co. Galway; the Rev. Joseph Greene found the pupæ at Rathfarnham, Co. Dublin; Killynon, Co. Westmeath; Enniskillen (*Partridge*); Knocknarea, Sligo (*Russ*).

Eupithecia plumbeolata, *Haw.*—Local. Killarney, common (*B.*), near Kenmare; Pontoon, near Foxford, Co. Mayo; not common.

Eupithecia isogrammata, *H.-S.*—Moycullen, Co. Galway; Knocknarea, Sligo (*Russ*); Favour Royal, Tyrone (*M.F.*); Castle Bellingham (*Thornhill*).

Eupithecia pygmæata, *Hb.*—Rare and local. "Co. Wicklow; Portmarnock, Co. Dublin; and Kilcornan, Co. Galway" (*B.*). I took a very fresh specimen, showing a purplish sheen on the wings, beside the river at Castle Bellingham, in company with Mr. Thornhill.

Eupithecia helveticaria var. arceuthata, *Frr.*—In Entom. iii. 192, Birchall mentions having captured at Killarney a single example, which was referred to this species by Harpur Crewe. It would be very desirable to learn in what cabinet this specimen is preserved.

(To be continued.)

NOTES ON THE GENUS *SIGARA*, Fabr. (RHYNCHOTA).

By G. W. Kirkaldy.

1. Sigara ovivora (Westw.).

Corixa ovivora, Westw., Proc. Ent. Soc. Lond. 1871, p. iv.

Through the kindness of Prof. Poulton, I have been able to examine the two types (male and female) of this species. Unfortunately both are (after the custom of a quarter of a century ago, and, it is to be regretted, sometimes at the present day) glued down on one entire surface on to the card (male venter downwards, female venter upwards); and, having regard to their poor condition, I have deemed it too risky to attempt a very complete examination. The following notes will, however, be perhaps some increase to our knowledge of the species and genus.

It is not a *Corixa*, but a *Sigara*, and allied to *S. minutissima* (Linn.); the width of the head at the base is greater than that of either of the eyes (as seen from above), and is about equal to the width of the vertex,* the interior lateral ocular margins being curved outwards from their base, and inwards again towards their apparent apical margin (as viewed from above). Looking at the face (*i.e.* the reflexed part of the head anterior to the "vertex," and posterior to the clypeus), the eyes appear subtriangular, the interior margins being subparallel to one another, the bases continuous with that part of the head, the exterior margins diverging curvedly from the capital lateral margins, and forming third sides subequal to the interior ocular margins; apex rounded. The length of the eyes (still viewing the face only) is about equal to the length of the head from the apices of the eyes to the apical margin of the clypeus. The base of the head is somewhat as in *S. minutissima* (Linn.); from the centre of the base the two halves curve downwards at an obtuse angle to one another. Head sordid testaceous; eyes dark purple-brown; pronotum light olive-brown (lateral and posterior margins rather broadly sordid luteous), transverse, about twice as wide as long, produced laterally beyond the ocular lateral margins; basal and apical margins very convex, the latter laterally sinuate; lateral margins very short, slightly diverging posteriorly, about one-seventh (roughly) of the middle breadth of the pronotum. The scutellum is olive-brown, and appears to be divided by a suture into two portions; I am not, however, acquainted with this structure in any other *Sigara*, and it may be due to bad preservation and shrinkage; across the centre of the posterior half of the scutellum is a short transverse dark stripe; also "metasterno profunde bisinuato, angulis posticis lateralibus elongatis" (Westw.). Pedes testaceous [I regret I can give no account of the palæ]; intermediate femora about equal to tibiæ and tarsi together; unguiculi rather longer than tibiæ, tarsi rather longer than unguiculi, and nearly twice as long as tibiæ. Hemielytra light olive-brown, obscurely spotted with brown [there appear to be three longitudinal stripes], superficially punctured, and sparsely furnished with short yellow hairs. Dorsum of abdomen olive-brown, paler at the margins; connexivum sordid testaceous. Entire ventral surface testaceous.

I have not been able to detect a strigil in this species, but the insect is so minute that the structure of this would be scarcely visible with a ¼-in. objective, and the broken and irregular male abdominal segments render the examination of an old and dry specimen a grave risk for its safety. L. 2·8 mm.; lat. hum. circ. 1·6 mm.

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* As explained in Ann. Mag. Nat. Hist. (6), xx. p. 60 (1897), I use "vertex" for the *apparent* apical margin of the head (as seen from above, when the insect is lying flat, venter downwards); this margin is therefore really more or less imaginary. Nevertheless it is extremely useful as a diagnostic character in the Notonectidæ and Corixidæ, to which families its use will be almost entirely restricted—in the sense indicated above.

Canara R. (India). Types, male and female, Hope Mus. Oxon.; another specimen in the same museum from Ceylon (Thwaites, 1872), I refer to this species.

2. Sigara siva, nom. nov., for
   Sigara striata, Fieb., Abh. k. böhm. Ges. Wiss. (v.), 3, p. 292, Taf. 1, f. 22–4, 1844.

Preoccupied by Fabricius, Ent. Syst. iv. p. 60, 1794 [which equals *Corixa geoffroyi*, Leach—typum vidi].

3. Sigara m-notata, nom. nov., for
   Sigara lineata, Fieb. *l. c.*, 293, Taf. 1, ff. 20 and 25, preocc. Fab., *l. c.*, p. 59.

4. The description of *Corixa albifrons*, Motsch., Bull. Moscou xxxvi. pt. 2, p. 94 (1863), is clearly that of a *Sigara*, but the too few structural characters given do not agree with any species known to me. In the absence of the type, or of specimens entirely agreeing with the description, the species must, for the present at least, remain doubtful.

Six *Sigaræ* have been now described from the Oriental region, viz. *albifrons* (Motsch.), *grisea*, Fieb., *m-notata* (=*lineata*, Fieb.), *ovivora* (Westw.), *punctata*, Fieb., and *siva* (= *striata*, Fieb.). These doubtless require revision. On the other hand, we cannot doubt but that an increase of interest in these small bugs will result in very many more being made known; and I take this opportunity of asking for material (Oriental or otherwise) in two of the aquatic families of Rhynchota—Corixidæ and Notonectidæ.

Summary.

1. *Corixa ovivora*, Westw., is a *Sigara*.
2. *Sigara siva*, nom. nov. for *striata*, Fieb. (nec. Fab.).
3. *S. m-notata*, nom. nov. for *lineata*, Fieb. (nec. Fab.).
4. *Corixa albifrons*, Motsch., is a *Sigara* ——? sp.

BUTTERFLY HUNTING IN THE HIMALAYAS.

By W. Harcourt-Bath.

To one only accustomed to collecting in Europe, the Himalayas constitute a wonderfully exciting field for research and exploration, especially to the student of entomology. The region in which I am travelling at the present time, namely, the eastern portion of this vast chain, is without doubt the richest of any for its extent in the Eastern Hemisphere. Within a radius of about fifty miles of my headquarters there are found as many as six hundred different species of butterflies, in addition to a large number of seasonal, climatal, and geographical varieties; while moths and beetles and other insects may be encountered in thousands. This is not only the case as regards the number of species, but individuals of many of them occur in the greatest profusion. The abundance of large and handsome butterflies in the tropical valleys is a sight not to be forgotten.

Up to an altitude of about 5000 ft. we get species characteristic of the Malay region, which is noted for its excessive richness in other branches of natural history, besides in entomology. It is here that one see the great Papilios in all their glory, as well as many large species of Danaidæ, &c. What a grand sight it is to view the gigantic *Ornithoptera pompeus*, or equally handsome *O. rhadamanthus*, sailing majestically through the forest glade, or the green and red-spotted *Papilio paris* and *P. ganesa* dashing about in the broiling sunshine, in company with many other beautiful species of the same genus; while the various species of *Euplœa*, with iridescent colours which change with every flap of their wings, occur in countless swarms within the shade of the luxuriant arborescent vegetation. Pre-eminently plentiful among these are *E. rogenhoferi*, *E. rhadamanthus*, and *E. core*. Several species of *Neptis*, noted for their graceful sailing flight, are also exceedingly plentiful in this zone, as is likewise the case with many species of Pieridæ, the commonest of all being *Ixias birdi*, a beautiful yellow orange-tipped form, which occurs in company with half a dozen pretty species of *Delias*.

The temperate zone, which rises above the preceding to the height of 10,000 or 12,000 ft., has an entomological fauna allied to that which occurs in the Manchurian Subregion of the Palæarctic Area of zoo-geographers, and is exceedingly like the European in its general facies, although a considerable proportion of subtropical forms are intermingled with it. At this altitude one encounters species closely allied to many which are among our most familiar butterflies in England, such as *Pieris brassicæ*, *P. rapæ*, *P. napi*, *Lycæna argiolus*, *Vanessa atalanta*, *V. urticæ*, &c., which are here represented by geographical forms, considered sufficiently distinct to be treated as separate species; while others are absolutely identical, such as *Vanessa cardui* and *Argynnis latonia*, which are both common insects at this elevation in the Eastern Himalayas.

At the altitude of 12,000 ft. and upwards the alpine and arctic entomological fauna of Thibet is met with, characterised by its several species of *Parnassius*, which produce such a typical feature in the scenery of the Alps.

Quite in harmony with the condition of things here explained, the scenery is of the grandest description imaginable. Mountain after mountain up to an altitude of 10,000 or 12,000 ft. is clothed with a dense forest of luxuriant vegetation embracing all the phanerogamic zones upon the earth, while above the whole tower the great snow peaks 20,000 to 29,000 ft. in height. An array of these giants stretches away as far as the eye can reach in a line 150 miles in length, presenting without doubt the most magnificent, imposing, and awe-inspiring spectacle of the kind in the world.

I must, however, hasten to close this brief epistle, for it is time to be up and doing once again. The sun is already shining on the topmost peaks of Everest, Kinchinjanga and Co., and the elegant *Teinopalpus imperialis* will shortly be flitting around the bushes of *Daphne nepalensis* now bursting into bloom in the elevated forests of Ghoomphar, Rungaroon, and Sonada. The needful apparatus being ready, the order to start is given, and I am off once more to be among the handsome insects which constitute the primary object of the present expedition.

BRITISH HYDROCAMPINÆ AND SCOPARIANÆ.

In Part II. of the 'Transactions of the Entomological Society of London,' published in July last, there is a paper by Sir George F. Hampson "On the Classification of two Subfamilies of Moths of the Family Pyralidæ: the Hydrocampinæ and Scoparianæ."

The British species referred to these two groups were placed by Meyrick in his Pyraustidæ, and are as follows:—

1. *Eurrhypara urticalis*, Linn., Meyrick.
2. *Botys hyalinalis*, Hübn. (*Psamotis hyalinalis*, Meyrick).
3. *Psamotis pulveralis*, Hübn., Meyrick.
4. *Perinephele lancealis*, Schiff., Meyrick.
5. *Stenia punctalis*, Schiff., Meyrick.
6. *Cataclysta lemnata*, Linn., Meyrick.
7. *Paraponyx stratiotata*, Linn. (*Nymphula stratiotata*, Meyrick).
8. *Hydrocampa nymphæata*, Linn., Meyrick.
9. *Hydrocampa stagnata*, Don. (*Nymphula stagnata*, Meyrick).
10. *Scoparia* (12 species).

In the system under consideration *Hydrocampa*, Latr., and *Paraponyx*, Hübn., are merged in *Nymphula*, Schrank, which is the fifth genus of the forty-nine genera referred to the Hydrocampinæ, and has fifty-three species assigned to it. Of these, *stagnata* is No. 2; *nymphæata* No. 3, and type of the genus; *stratiotata* No. 26.

Cataclysta, Hübn., is the seventh genus, with *lemnata*, its type, occupying fifth place among the forty-eight species comprised in it.

Stenia, Guen., with eleven species, ranks as the thirty-eighth genus; *punctalis*, the type, is placed third in order of species.

Psamotis, Hübn., which includes *Perinephele*, has only three known species, *i.e. lancealis*, *pulveralis* (type), and *hyalinalis*. It is the forty-sixth genus, and is immediately followed by *Eurrhypara*, Hübn., of which *urticalis* is the only known representative.

The Scoparianæ are a compact little group of seven genera, but only the typical one—*Scoparia*—is European. This genus, which occupies sixth place in the arrangement, is divided into two sections; the first comprising one hundred and thirty-two species, and the second only one; *S. cembræ* is the type.

In the subjoined list of species found in Britain the number in brackets indicates the position of the species in the genus. It will be seen that *basistrigalis*, *atomalis*, *ulmella*, and *conspicualis* are sunk in *ambigualis; scotica* is removed from *zelleri*, which is not now considered to be a British species, and is placed with *cembræ; frequentella*, Staint., is employed for the species hitherto referred to as *mercuriella*, Linn., and *portlandica* is given as a synonym of it instead of *phæoleuca*, Zell., which is deposed, or rather relegated, together with *vesuntialis*, Gn., to a list of unplaced species; *gracilalis* becomes a synonym of *alpina*. *Ingratella*, Zell., which is a South European species, possibly ought never to have been included in the British list.

It will probably be admitted that this revision of British *Scoparia*, which agrees with that of Mr. Meyrick except as regards the sequence of species, is in accordance with our present knowledge. There is, however, one species for which a claim to specific rank may be urged, *i.e. basistrigalis*. Although I cannot myself see that it differs in any essential character from *S. ambigualis*, I am well aware that several able entomologists consider it to be quite distinct from that species.

R. S.

SYNONYMY OF THE BRITISH SPECIES OF *SCOPARIA*.

(Abstracted from Trans. Ent. Soc. Lond. 1897, pp. 234–236).

Genus Scoparia, 133 species. Type *S. cembræ*.

(90). Scoparia ambigualis, Tr., Schmett. Eur. vii. p. 184.
Eudorea mercurella, Lah. Pyr. No. 76.
E. conicella, Lah. Pyr. No. 76*b*.
E. ancipitella, Lah. Pyr. No. 86.
E. basistrigalis, Knaggs, E. M. M. iii. p. 1 (var.).
E. octavianella, Mann. W. E. M. 1859, p. 164 (var.).
Scoparia atomalis, Doubl. List (var.).
Eudorea ulmella, Knaggs, E. M. M. iii. p. 217.
E. conspicualis, Hodgk. E. M. M. xviii. p. 134.

Scoparia signella, Teich. Arb. Ver. Riga vi. p. 72.
S. tæniatella, Teich. Arb. Ver. Riga v. p. 73.
S. incertalis, Dup. Lep. Fr. viii. p. 286, pl. 229, fig. 4.

(91). Scoparia dubitalis, Hübn. Pyr. p. 49.
Tinea pyralella, Hübn. Tin. fig. 167.

(94). Scoparia cembræ, Haw. Lep. Brit. p. 498.
Eudorea cembrella, Steph. Ill. iv. p. 299.
E. subfusca, Steph. *l. c.*
E. asphodeliella, Lah. Pyr. No. 74.
Scoparia erralis, Guen. Delt. and Pyr. p. 421.
S. scotica, White.

(95). Scoparia pallida, Steph. Ill. iv. p. 300.
Eudorea ærtzeniella, H. S. iv. p. 49, fig. 97.

(100). Scoparia truncicolella, Stn. Man. ii. p. 161.
Eudorea murcurella, Zell. L. E. i. p. 293.

(101). Scoparia cratægella, Hübn. Tin. fig. 231.

(102). Scoparia frequentella, Stn. Man. ii. p. 162.
Eudorea portlandica, Dale E. M. M. xxi. p. 275.

(103). Scoparia murana, Curt. B. E. iv. p. 170.
Scoparia tuoniana, Hoffm. Stett. Ent. Zeit. 1893, p. 130.

(106). Scoparia alpina, Stn. Man. ii. p. 163.
Eudorea gracilalis, Dbl. Stn. Man. ii. p. 163.

(108). Scoparia angustea, Steph. Ill. iv. p. 302.
Eudorea coarctata, Zell. L. E. i. p. 308.
Scoparia amissella, Mill. Icon. i. p. 401, pl. L., fig. 1.

(112). Scoparia lineola, Curt. B. E. iv. p. 170.

(113). Scoparia resinea, Haw. Lep. Brit. p. 499.
Eudorea vandaliella, H. S. vi. p. 143, fig. 157.
Scoparia resinea v. *orientalis*, Alph. Troudy. Ent. Ross. x. p. 26.

THE ASIATIC DISTRIBUTION OF BRITISH GEOMETRIDÆ.

The following list is compiled from a comprehensive paper on "Geometridæ from China, Japan, and Corea," by Mr. J. H. Leech, recently published in vols. xix. and xx. of the 'Annals and Magazine of Natural History.'

The number of species belonging to this family recorded from the region dealt with is nearly nine hundred. A great many of these are European species, nearly the whole of which are found in Britain.

Mr. Leech's arrangement, which is based chiefly on the system of classification employed by Sir George Hampson in his 'Moths of India,' has been followed as regards subfamilies and the sequence of genera; but where the generic name adopted by Mr. Leech is different to that used in the Entom. Syn. List, the former is placed in brackets. The position of the species in in Mr. Meyrick's "Revision of the European Geometridæ" (Trans. Ent. Soc. Lond. 1892) is also indicated.

URAPTERYX SAMBUCARIA, Linn.

Occurs in Amurland, Japan, and Western China.

Most Eastern Asian specimens are referable to var. *persica*, Mén., which is whiter than the type; but the type also occurs at Omei-shan and Pu-tsu-fong, in Western China.

BAPTA BIMACULATA, Fb. = *subnotata*, Warren.
Pseudopanthera bimaculata, Meyr.

Mr. Leech has specimens from Japan, Yesso, and Corea.

BAPTA PUNCTATA, Fb. = *temerata*, Hb.
Asthena sancta, Butl.
Pseudopanthera punctata, Meyr.

Occurs in Amurland, Japan, and Yesso.

Some specimens from the mainland of Japan are typical; others are suffused with greyish, and the markings are more or less obliterated. Mr. Leech states that he has examples from Germany which are somewhat similar to the suffused form.

ANGERONA PRUNARIA, L.
Euchlæna prunaria, Meyr.

Occurs in Amurland, Corea, Japan, and Yesso.

"Most of the European forms are represented in Japan, but there is a wider range in the size of the specimens, the smallest example being only 36 millim., whilst the largest measures 74 millim."

NUMERIA PULVERARIA, Linn. = *japonica*, Butl.
Metrocampa pulveraria, Meyr.

Recorded from Amurland, Japan, Kiushiu, and Corea.

Mr. Leech notes that "the specimens from Gensan and Kiushiu are very small."

SELENIA TETRALUNARIA, Hufn. = *illustraria*, Hb.

The typical form was obtained at Hakodate, in Yesso, in the month of June, and the var. *æstiva* in August.

Appears not to have been observed in any other East Asian locality.

PERICALLIA SYRINGARIA, Linn.
Hygrochroa syringaria, Meyr.

Mr. Leech is of opinion that *P.* (*H.*) *distans*, Warr., may possibly be an Asiatic form of this species, and he further considers that *P. parva*, Hedem., from Amurland, may be identical with *P. distans*.

Epione (Cepphis) advenaria, Hb.

Occurs in Amurland, Japan, Yesso, and Corea. The specimens are typical.

Himera (Colotois) pennaria, Dup.

Specimens from Amurland and Japan are of the typical form.

Ennomos autumnaria, Wernb. = *alniaria*, Esp.

Specimens from Amurland, Japan, and Yesso agree with those from Europe.

Eurymene dolabraria, Linn.
Metrocampa dolabraria, Meyr.

Only record from Yesso. Typical.

Lozogramma petraria, Hb.
Pseudopanthera petraria, Meyr.

The specimens from Japan, Yesso, Central and Western China, are of the normal form. The species also occurs in Amurland.

Macaria alternata, Hb.
Opisthograptis alternaria, Meyr.

Recorded from Amurland. Mr. Leech believes that *M. shanghaisaria*, Walk., which is found in North China, Japan, and Yesso, as well as in Amurland, may be a local form of *M. alternata*.

Strenia clathrata, Linn.
Opisthograptis clathrata, Meyr.

Specimens from Amurland, Japan, and Yesso do not differ from European.

Halia (Tephrina) brunneata, Thnb.
Diastictis brunneata, Meyr.

Occurs of the typical form in Amurland and Japan.

Cabera (Dilinia) exanthemata, Scop.

Typical in Amurland and Yesso.

A closely allied species, *C.* (*D.*) *schæfferi*, Brem., occurs in Corea and Western China, as well as in Amurland.

Hybernia leucophæaria, Schiff. = *dira*, Butl.

Some of the Japanese examples are of large size (*dira*, Butl.), but in other respects they do not differ from European specimens. One form, var. *nigrilinearia*, Leech, is of a pale ochreous grey colour, with the second transverse line "deeply indented below the middle, and the space between this line and the curved basal line is thickly sprinkled with blackish scales, forming a dark median fascia, in the central portion of which is placed a pale oval patch; median nervure conspicuously black; before the apex is a blackish, oblique, abbreviated fascia."

This species is only recorded from Japan.

Phigalia pedaria, Fb.
Apocheima pedaria, Meyr.

This species is represented in Japan by *P. sinuosaria*, Leech, a species new to science.

(To be continued.)

NOTES AND OBSERVATIONS.

Pairing of Spilosoma fuliginosa with Arctia caia. — The male was a dark specimen of *S. fuliginosa* bred from some Scotch ova. I have kept both these moths in the same cage before without experiencing so curious a result. Considering *A. caia* was a female proportionately large, and had only a few days previously deposited some ova, it strikes me this is worthy of publication, as at the time of assembling there were some five or six females, newly out, of *A. fuliginosa.* July 20th, I removed the pair to a jar, when a day later the female again laid over fifty more eggs, which I hope will prove fertile. —H. W. Bell-Marley; Ravenscourt Park, W.

Setina irrorella on the Cotswolds.—Mr. George Harding (Ent. Mo. Mag., August) records the occurrence of *S. irrorella* on the Cotswold Hills in Gloucestershire. He states that "for many years a specimen or two has occurred now and then at one or two localities at a high elevation" on these hills; this year, however, he secured a fine series. Mr. Harding has been good enough to send me a pair of these Gloucestershire insects, which he believes to be a form intermediate between *S. irrorella* and *S. aurita.* Until the matter was thus introduced, I had not considered the question of the specific identity of these two insects, but after a careful examination of the series of each in Mr. Leech's collection, I do not dispute the possibility of *aurita* being an alpine form of *irrorella;* but I can hardly endorse the opinion that these Gloucestershire examples are to be regarded as links connecting *irrorella* with *aurita.* The male specimen sent me is deeper in colour than most of my Box Hill examples, but is identical in this respect with one from Folkestone; the female is certainly of a richer coloration than any other example of this sex in my collection. —Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

CAPTURES AND FIELD REPORTS.

Chœrocampa elpenor in Suffolk.—During the last fortnight I have found twenty-four larvæ of *C. elpenor* on the banks of the Stour. They were nearly all feeding on willow-herb.—(Miss) M. Wilson; Cavendish Rectory, Suffolk, Aug. 22nd, 1897.

Acherontia atropos in Suffolk.—I have a fine chrysalis of *A. atropos* which was obtained here in the larva state about three weeks ago. Several other specimens were seen in a potato-field.—(Miss) M. Wilson; Cavendish Rectory, Suffolk, Aug. 22nd, 1897.

Colias edusa in Oxfordshire.—On Aug. 9th I caught, in a field near Charlbury, Oxfordshire, a fine female *C. edusa.* Is it not very unusual to find them so far inland?—Gwendaline Mathew; Sandford Mount, Charlbury, Aug. 20th, 1897.

[Although it is not altogether unusual for this species to be observed in our inland counties, especially in what are known as "*edusa* years"—that is, years when the species is plentiful—its occurrence in Oxfordshire this year is an interesting fact to record.—Ed.]

Lycæna argiolus in Chiswick.—I am glad to state that this handsome little butterfly has by no means been an uncommon visitor this season. It was Easter Day when first my attention was called to its appearance; this was in Hammersmith. Only on the same morning, in Chiswick Lane, was I able to testify to the fact that they were distributed, flying, then settling on the ground. This was the first brood, according to Mr. W. F. Kirby. I saw no more until to-day (Aug. 1st), when in the same lane there were about five, settling as before on the ground; one I caught as it was drinking from a puddle.—H. W. Bell-Marley; Ravenscourt Park, W.

Cicindela germanica in Dorset. — Mr. Pickard-Cambridge will doubtless be glad to know that this local beetle is still to be found in the locality recorded by him (between Bridport and Lyme Regis) in 1888 (Entom. xxii. 214). On July 18th I took forty examples in the course of half an hour, and might easily have obtained twice the number. It appeared to be confined to one damp place, but was plentiful in that spot, some four or five specimens being often seen at the same moment running swiftly among the scanty herbage and over the loose earth. There is, I think, small fear of its being exterminated for many years. — F. W. Lambert; 70, St. Giles, Oxford.

Callimorpha hera.—On Aug. 18th I took in my garden at Alphington, near Exeter, at 8.30 in the morning, a fine female specimen of *C. hera;* hind wings orange, inclining to red. The moth was flying in the sunlight, and had settled on the head of an aster flower.—(Rev.) Albert Bonus.

[The first capture of this species in South Devon was at Alphington about twenty-eight years ago.—Ed.]

Entomology in Merionethshire.—During a stay at Barmouth from July 10th to 24th, I chiefly occupied myself in collecting and observing the insects of the surrounding country. The following is a complete list of the insects which came under notice; when no locality is specially mentioned, Barmouth is intended:—

Lepidoptera: *Pieris brassicæ, rapæ,* and *napi.* All common.—*Epinephele* (*Hipparchia*) *ianira.* Very common; many of the females were unusually large and bright, and the ocelli on the under side were especially finely developed.—*E.* (*H.*) *tithonus.* Not common.—*E.* (*H.*) *hyperanthus.* Varies considerably in the ground colour of the under side, and in the number and development of the ocelli; not met with at Barmouth, but common at Tan-y-bwlch.—*Satyrus* (*H.*) *semele.* In perfect condition at Barmouth; much darker than those which I have taken on limestone in other parts of Wales. The rock here is a dark slate, so the intensity of colour is probably for protective purposes. — *Cœnonympha pamphilus, Pararge* (*Lasiommata*) *egeria.* Scarce.—*P.* (*L.*) *megæra, Argynnis paphia.* Woods about Barmouth, Tan-y-bwlch, and Dolgelly, but not plentiful.—

A. aglaia and *adippe.* Both very common at Barmouth and Tan-y-bwlch, and in all the large woods and openings up the Vale of Festiniog.—*A. selene.* Several much worn examples of the first brood met with (very late to linger on the wing) at Barmouth and Tan-y-bwlch.—*Vanessa urticæ, V. (Cynthia) atalanta, Thecla rubi.* Just beginning to appear at Barmouth.—*Lycæna icarus, Chrysophanus phlœas, Hesperia sylvanus.* Worn.—*Macroglossa stellatarum.* At flower of valerian, which grows in profusion at Barmouth. — *Zygæna filipendulæ.* Very generally distributed; larvæ swarmed on almost every flower-head of ragwort.—*Euchelia jacobææ, Hepialus sylvanus, Bombyx rubi, B. quercus, Saturnia carpini.* Larvæ of all three on the heather-covered mountains at Barmouth.—*Thyatira derasa.* At sugar on Barmouth sand-hills.—*Bryophila perla.* At sugar and valerian blossom.—*Leucania conigera.* Common at valerian; varies considerably in depth of colour.—*L. lithargyria.* Both at sugar and valerian.—*Xylophasia lithoxylea.* Swarms at valerian.—*X. polyodon.* A pest, especially at sugar.—*Mamestra brassicæ, M. albicolon.* At sugar on sand-hills and valerian.—*Caradrina cubucularis, Agrotis exclamationis, A. corticea, A. cursoria, A. tritici,* and *A. ravida.* All at flowers of valerian. The *A. exclamationis* all bore a reddish tinge; only one specimen of *A. ravida* was met with. *Triphæna pronuba, T. orbona, Abrostola tripartita.* Barmouth, one.—*Plusia gamma.* Met with wherever I went; all much worn.—*Boarmia rhomboidaria.* Some remarkably pale forms.—*Geometra vernaria.* Rather generally distributed around Barmouth.—*Acidalia marginepunctata.* At valerian.—*A. aversata, Cabera exanthemata, Halia wavaria.* Valerian, scarce.—*Ematurga atomaria, Camptogramma bilineata.* Very variable; two taken without hardly a trace of marking, also several with a blackish tinge.—*Eubolia palumbaria.* Everywhere among heather.—*Anaitis plagiata.* Barmouth; was almost over. — *Tanagra atrata.* — AUGUSTUS D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, July 30th.

NOTES FROM CARLISLE.—So far this season seems to be the record one here both for scarcity of larvæ and imagines, especially Noctuæ. Butterflies have been fairly well represented, but this is a poor district for Diurni when compared with some of the southern counties. However, the species that do occur with us were pretty plentiful. *Lycæna minima* was very common, as also were both larvæ and imagines of *Melitæa aurinia. Cænonympha typhon* was also very abundant, especially on Bowness Moss, which I visited on July 1st, when, although the day was anything but an ideal one for collecting, I found this butterfly swarming. Owing to the strong winds which had been prevailing for a considerable time previously, a large number of the specimens I got in the net I released again owing to their damaged condition; large pieces being broken out of their wings, although they were not rubbed in the least. I got a good quantity of ova from some I took, most of which hatched, even after having been subjected to ammonia as they were sticking to the edges of the pill-boxes. The young larvæ, however, have a very sickly appearance and are dying fast. I went to Silloth for *Satyrus semele* on July 19th and found it very plentiful. I was much surprised to have my attention called to a male *semele* and a female *atalanta* in cop. on a stem of grass; I did not disturb them. Is not this rather unusual? With regard to sugar, I may say that I have been out over a dozen times and have had only two nights worth mentioning. Mr. Day, Mr. Wilkinson, and I journeyed to Bolton Fell, which, by the way, means a walk of something like twenty-six miles, on June 26th. We did extremely well at sugar, our take being both numerous and variable, although principally common things, the best of which were *Agrotis strigula* (*porphyrea*), *Acronycta menyanthidis*, *Macaria liturata*, &c. I and a friend walked to the same place on July 17th, a much more promising night for sugar than June 26th, but we only obtained two moths, one *Triphæna pronuba* and one *Xylophasia polyodon*. However, we have one consolation—things *may* improve, but they cannot get worse.—J. E. Thwaytes; 8, Clement Place, Boundary Road, Carlisle, July 23rd, 1897.

Notes on the Season: Chester District.—January was a severe though changeable month with us—a mixture of frost, thaw, and snow, and I saw no insects. But by February 14th the gardens were gay with crocuses, and *Hybernia rupicapraria* was to be seen, commonly enough, at rest on the gas lamps. It was the 20th of March before I paid my first visit of the season to Delamere Forest, and then it was too late for such things as *H. leucophæaria* and *Anisopteryx æscularia*, excluding, of course, occasional late specimens. Matters to me of greater interest were: (1) Hybernated larvæ of *Bombyx rubi*, of *Spilosoma fuliginosa* and *Nemeophila russula*; (2) imagines of *Tephrosia crepuscularia* = *biundularia* = *bistortata*, all of which were conspicuous by their absence. It was a fine spring day, but moths were few, except *Tortricodes hyemana*, which was unusually abundant. *Asphalia flavicornis*, *Phigalia pedaria* (*pilosaria*), *H. leucophæaria*, and *Diurnea fagella* were represented by one each; and I took two examples of *A. æscularia*. An entomologist I met in the Forest showed me his box with three male *Nyssia hispidaria*, four or five fine *Amphidasys strataria* (*prodromaria*), and a similar number of *P. pedaria* (*pilosaria*), the last being undersized males and not well marked. I saw several *Brephos parthenias* on the wing. Larvæ of *Arctia caia* have not been nearly so plentiful as in last spring. I took a lot on April 2nd, as well as on subsequent dates in the month. They were in their first and second stages after hybernation. I kept them in an average temperature of 60° Fahr., and they all repaid my trouble, by the end of June, by turning out the most typical moths imaginable. I took my first *T. biundularia* (?) on April 3rd, in Delamere Forest, very dark, as usual, but well banded. My other captures were two *Lobophora carpinata* (*lobulata*), one *P. pedaria*, and a *Tæniocampa cruda*, all at rest either on trees or palings. Although I saw my first swallow on April 17th, we had a cold, wet and miserable Easter week. It was indeed a pitiful time for hunters of *Agrotis ashworthii*; and disappointment and discomfort must have been general, especially among those who had travelled long distances by excursion trains. Some were blocked at Chester on Good Friday—no trains! I got a few larvæ, but not by the labour of my own hands (and feet), and half of these died. On April 24th I again visited Delamere Forest for *T. biundularia*. I took six—three males and three females—one *carpinata*, and a nice *Eupithecia* not yet determined; and these were the sum total of five hours' hard work! Larvæ of *B. quercus*—they are observers of neither times nor seasons—in the second stage, were occasionally met with in May, in damp hedge roots about Chester, feeding on meadow sweet. They were very fond of sallow in confinement. As I write (July 22nd) some of these larvæ have already spun up; others are feeding, and evidently intend to continue doing so, whilst a fine female emerged at the end of June, but I think from last year's pupæ—I am, however, uncertain about this. My first white butterfly I saw on May 1st, in Eastgate Street—*Pieris rapæ*; in fact the "whites," including *P. brassicæ* and *Euchloë cardamines* (the latter very local), were common in May; and so were *Heliaca tenebrata* (*arbuti*) among the buttercups, and, in marshy places, the graceful little "blue" dragonflies, *Agrion puella* and *Ischnura elegans*. On May 24th a Chester friend sent me a couple of large dark reddish brown Geometer larvæ found feeding in his garden on ivy. About the middle of June they turned out a fine male and female *Boarmia rhomboidaria*. On May 29th I went to Delamere Forest again for *T. biundularia*. The moth was over. I took two *Cidaria corylata*, and several very variable *Tortrix ministrana*. Larvæ from low birches were four *Geometra papilionaria*, all free from parasites. Several *A. flavicornis*, *Tortrix corylana*, and one of *Hybernia aurantiaria*. Three of the *G. papilionaria* emerged as moths on July 2nd and 3rd, the fourth on the 17th. Between June 2nd and 10th *E. pulchellata* appeared in my breeding-pots, from last year's larvæ taken in Delamere Forest from foxglove flowers in July. June 5th was one of the most enjoyable days spent in the Forest district (Whitegate Heaths). Object: *Cœnonympha typhon* (*davus*), but it was not in evidence. Other insects were *Ematurga atomaria* (abundant and variable), *Melanippe sociata* (*subtristata*), *Acronycta rumicis*, *Hypsipetes impluviata*. Beetles, such as *Cicendela campestris* and Coccinellidæ, were on the wing in green and scarlet, common and numerous. Dragonflies were represented by *Æschna juncea*, plenty of *Leucorrhinia dubia*, and *Enallagma cyathigerum*, together with numbers of *Libellula quadrimaculata*. The hot sun made the birches give out a strong primrose-like scent. I nearly trod on a linnet's nest full of loudly protesting youngsters. Now followed some cold non-entómological weather, which changed all at once to the proverbial "Queen's"—appropriately enough on Jubilee Day (June 22nd). On the 23rd I found a freshly emerged black *A. betularia* at Chester; in fact we only seem to get the type now in Delamere Forest, and there it occurs side by side with the black form. June 24th and 25th were dull quiet days, the very weather for rock and tree hunting in the early morning. June 26th, Delamere Forest. Hot and sunny. *Thecla rubi* plentiful, but in poor condition. Other lepidopterous insects were *Nemeophila russula*, *Pseudoterpna pruinata* (*cytisaria*), *Drepana falcataria* (*falcula*), *Eubolia palumbaria*, and a few other common geometers. Generally speaking, this appeared to be a gala day at Delamere among the local insects, for I never saw so many at a given time. True the gadflies took a liberal tax from the human onlooker, until a blow from the hand settled the account. For days afterwards there would be little swellings and smartings at the punctures, but all this is inevitable if we get into such company. Ichneumons were busy and quick in their movements among the leaves, where, curiously enough, there seemed to be no larvæ. One wasp-like species, with a pair of long tail-like appendages, I tried hard to get, but failed. Great spiders in pea-green, and with a rose-coloured patch on the abdomen, sat on the birch leaves, whilst a beetle, with dark bronze-green thorax and bronze-brown wing-cases (possibly *Phyllopertha horticola*), spun and danced without moving an inch from directly over the centre of the birch bush. It is to be hoped the creature's enjoyment was commensurate with its activity. I only saw one *C. typhon* (*davus*) at Delamere this season—July 3rd—a fine fresh female full of eggs, and of course I let her go. Curious that *Anarta myrtilli* should be so comparatively scarce, while, on the other hand, *Plusia gamma* appears to have obtained a new lease of life. On July 14th a fine *Æ. grandis* was brought to me, which had flown into a shop in the city the previous evening. Altogether the present season promises to be a good one. There was some cloudy, warm, showery weather about the 10th, which ought to have attracted good things to sugar for collectors favourably situated.—J. Arkle; Chester.

SOCIETIES.

Birmingham Entomological Society.—*July 19th*, 1897.—Mr. G. H. Kenrick in the chair. Mr. Bradley showed cocoons and imagines of *Apanteles formosus*, an ichneumon parasitic on *Urapteryx sambucata*, the cocoons being suspended from leaves, &c., by means of long filaments; also a male *Sirex gigas* from Sutton. Mr. Kenrick showed some Lepidoptera from Inverness-shire. *Anarta melanopa*, which he said was not long ago supposed to be confined to Rannoch, is now known to occur thoughout Inverness-shire, about 3000 feet above the sea-level; and also he had seen it in another locality. The specimens exhibited came from a spot nearly on the borders of Inverness-shire and Perthshire, where the species is common. He also showed, from the same county, *Hadena glauca*, which was common; *Scodonia belgiaria;* a *Nemeophila plantaginis*, with dark females, which he said were probably var. *hospita.* Mr. Chase exhibited living larvæ of *Eriogaster lanestris.*—Colbran J. Wainwright, *Hon. Sec.*

RECENT LITERATURE.

Descriptive List of the British Anthomyidæ. By R. H. Meade, F.R.C.S., &c. Two Parts. 8vo, pp. 79. London: Gurney & Jackson. 1897.

Although the order Diptera is gradually attracting more students, it has always been strangely neglected in England; and while France, Holland, Austria, Italy, and even Lapland possess good monographs, we have nothing beyond one or two introductory works, lists, and the obsolete and avowedly incomplete volume in the 'Insecta Britannica,' by Walker. Hence every fresh contribution to the literature of British Diptera by a competent author is likely to be very useful to the student; and Mr. Meade, who has been working at the Diptera many years, has done well to publish a series of descriptions of the British genera and species of the interesting and extensive family of Anthomyidæ, of which he published a preliminary list, in the 'Entomologist's Monthly Magazine,' some years ago. We hope that other dipterists may be encouraged to do the same good service for other families; and that by and bye one of them may take courage and give us a complete book on the dipterous fauna of Britain, for which there could be no more admirable model than Schiner's two volumes on Diptera in the 'Fauna Austriaca.' —W. F. K.

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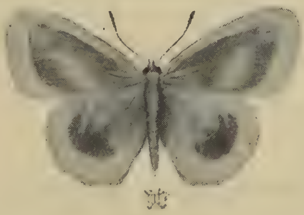
EPINEPHELE TITHONUS, ♂ AB.



The remarkable aberration of *E. tithonus* figured above was taken by Mr. Henry J. Spindler near Luggershall, Sussex, on July 29th. The normal fulvous colour is present in its usual intensity, but the whole of the typical dark brown is replaced by a pale pinkish ochreous; the subapical spot of fore wings and the sex brand are also of this colour. In the figure the shaded portions represent the fulvous tint proper to the species, whilst the pale portions show the aberrant colour. The under surface is affected in the same way.

Referring to the aberration of this species, Mr. Barrett (Lep. Brit. Isl. i. p. 247), after discussing variation in the spot markings, says:—"Still another form of variation, or rather aberration, consists in the substitution of pale yellow, or silvery white, for the fulvous ground colour, the brown markings being unaffected, or even intensified; as in a male in Mr. H. Goss's collection, having broad dark brown margins and central cloud, yet the ground colour nearly white. Mr. S. J. Capper has a straw-coloured male, one sent me from Gloucestershire by Mr. R. C. L. Perkins is whitish except a fulvous tinge near the marginal band, and Dr. Mason has one with the fore wings half fulvous, half white. Mr. S. Webb has both sexes of a clear silvery white, the female combining with this the other variation of large extra spots in the fore wings; also one in which the hind wings are shaded with white from the margins; and Mr. S. Stevens, besides a silvery white female, taken at Torquay, and another of the same sex in which the marginal band has disappeared, has a male without the subapical black spot."

All the instances mentioned above are ground colour aberrations, with the exception of the last but one; that example, however, must be very different to the specimen now figured.

Mr. Tutt informs us (*infra*) that he has a specimen of this species which is somewhat similar to that captured by Mr. Spindler, also parallel forms of *Erebia goante*. I may mention that a figure of *Pararge* (*Satyrus*) *egeria* in the 'Tijdschrift voor Entomologie,' 1865 (pl. ii. fig. 1), represents a specimen in which the usual dark brown is changed to pinkish ochreous, but the central area of primaries and the costal and upper portion of the outer margin of secondaries are slightly suffused with dusky. The black spots retain their normal appearance.

R. S.

ON A LUTESCENT ABERRATION OF *EPINEPHELE TITHONUS*.

By J. W. Tutt, F.E.S.

In connection with the lutescent aberration of *Epinephele tithonus* exhibited at the meeting of the South London Entomological and Natural History Society, held on Sept. 9th last, I may mention that I have a somewhat similar specimen of this species, and also parallel forms of *Erebia goante*, in which the dark colour is reduced and altered, although the orange portions of the wing remain normal, and, by comparison with the pale surrounding area, appear redder than it usually does in these species. Further, I have an exactly parallel aberration of *Angerona prunaria*. All these aberrations are without doubt quite natural; but in the course of some experiments which I carried out with Mr. Coverdale some fifteen years ago, we discovered that the black-brown of *Epinephele* was very inconstant, and liable to change. With regard to the probable interpretation to be put on these natural aberrations, in the light of our previous experiments, I made the following remarks in 'The British Noctuæ and their Varieties' (vol. ii. pp. ix–x, 1891):—"Perhaps one of the most interesting results with an alkali is to get a direct development of yellow leading up to the brown, as exemplified in typical *Cœnonympha pamphilus*, *C. davus*, &c. Under the action of ammonia the pale under sides and fringes of these species become very yellow, and lead insensibly into the normal brown coloration. It would seem therefore that the general action of alkalies, in this direction, is to develop progressive coloration—white (pigmented) to yellow, and yellow to red (-brown); whilst Mr. Coverdale wrote in 1886 (error for 1884),* that 'a great many acids (hydrochloric, nitric, sulphuric) restored the pigment, when thus changed to its natural colour.' Whilst dealing with this relation of brown and yellow, I would notice that the dark brown edging to the anterior wings of *Epinephele tithonus*, *Cœnonympha pamphilus* ab. *lyllus*, and their allies is much more readily acted on than is the orange colour in this species, which is rather remarkable when the colours are considered in their genetic relationship, but is not at all so from a varietal point of view. The unstable character of this band is very marked, and only occurs occasionally in certain varieties of some species, although it is quite constant in others. Here then we notice that a colour in a condition of transition or formation may be, and probably is, more unstable than the colour from which it springs, although the latter, genetically considered, is of course lower than the former. . . . The transitional and unstable character of the darker colour in *Epinephele* and its allies gives a decided proof of their probable recent development. The brown found in those varieties of *Angerona prunaria*, in which the bright orange is reduced to a patch in the central area of the wing, is also of a very unstable nature, and easily affected; not so the orange, which is particularly stable," &c.

It is many years since I interested myself in this branch of the subject, my notes, that I published in 1891, having been made between 1881 and 1884, or thereabouts, possibly before I had contributed to any entomological magazine; but it seems to me that the explanation offered is a sound one with this addition. The recent researches into the structure of the scales of Lepidoptera, and the physiological conditions involved, both subjects which I have recently dealt with at length, suggest that whenever a natural aberration is the result of the degradation of a pigment considered genetically, it sometimes produces much the same result as the reduction of the pigment treated chemically—that is to say, both may produce atavic results; in fact, these natural aberrations are the only guide one has to tell whether the colours produced chemically are indeed primitive forms of the coloration of the insects or not. At any rate, that is the only explanation I have to offer of the fact that these aberrations are so generally distributed among orange-coloured species with a tendency for some part of the orange to be replaced by some darker shade of brown.

I may add that I have a recollection that this particular aberration of *E. tithonus* is so far well known on the Continent as to have received a distinct varietal name, but I cannot call to mind the reference at the present moment.

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* "The Action of Ammonia upon some Lepidopterous Pigments," Entom. xvii. pp. 204-206.—Ed.

[The only named variety of *Epinephele tithonus* of which I have seen any description is v. *mincki*, Seebold (Berl. Ent. Zeit. xxxvi. 467 (1892), but this hardly agrees with Mr. Spindler's aberration.—R. S.]

ACOSMETIA MORRISII, Morris.

By H. Guard Knaggs, M.D., F.L.S.

May I be allowed to correct some inaccuracies which occur in Mr. Meyrick's 'Handbook of British Lepidoptera,' p. 121, respecting an insect which is there referred to as *Caradrina morrisii*, Dale?

In the first place the late Mr. Dale never described the insect in question; he may have ticketed it *morrisii*, but manuscript names are not now recognized. It was the late Rev. F. O. Morris himself who described his own namesake; therefore the name, if resuscitated, should be *morrisii*, Morris.

In Mr. Meyrick's 'Handbook' it seems to be taken for granted that *morrisii*, Morris, and *bondii*, Knaggs, are identical; not only that, but *morrisii* has been redescribed, and one of its features, the "slightly brown costa," which *bondii* does not possess, has been omitted, whilst the dotted second line of *bondii*, which is absent in *morrisii*, has been added; so that the description of *morrisii* must have been taken from *bondii*, and it is pretty evident that the writer of it has never seen either *morrisii* or the original description of it.

The sanction of the name of so high an authority as Mr. Meyrick to the statement that *morrisii* and *bondii* pertain to one and the same species is, in my opinion, calculated to stifle independent investigation, and to deter the entomological public from referring to the original description; otherwise I should not have taken the trouble to notice it. As it is now just sixty years since the original description saw the light of publicity, there seems danger of its becoming lost in the mists of antiquity; and as no entomologist living or dead, with the sole exception of Humphreys and Westwood, has alluded to it until quite recently, I trust that you will permit me to lay it before your readers, in order that they may judge the case for themselves. It is extracted from 'The Naturalist,' vol. ii. p. 88, 1837:—

"Notice of the Discovery of a New Insect, Acosmetia morrisii, *Dale MSS.*—I have great pleasure in forwarding for your pages a description of a species of *Acosmetia*, which I believe to be entirely new to entomologists. My kind friend Mr. Dale has been so good as to name it after me, as the discoverer of the insect. The following is a general description:—

"Pale straw-colour approaching to silvery white, the upper part of the wings very faintly streaked with narrow brown lines, diverging (from an obscure black dot?) towards the margin, which is of the same colour with the rest of the wings, from which they are hardly distinguishable; the wings underneath* are divided transversely by a faint waved brown line, and the margins clouded with the same colour. The insect is an inch and half a line in width from tip to tip, and is not thick bodied, though belonging rather to that class than to the thin bodied. The first specimens I took were met with, several years ago, near Charmouth, Dorsetshire, beyond a lime-kiln on the cliff on the east side of the little river Char. I believe individuals may be taken there every year, though they certainly are not common. They rise up from the grass and fly well and straight, on being disturbed in the daytime, somewhat after the manner of *Plusia gamma* (when not flying voluntarily), and are rather difficult to capture. They seem to be † among the long grass, to which they assimilate in colour. I do not remember the exact time of their appearance, but it was about the middle of summer, and they remained 'out' a considerable time. Mr. Dale has also taken specimens at the same locality.

(Signed) FRANCIS ORPEN MORRIS."

"April 4th, 1837.

N.B.—In comparing the above description of *morrisii* with *bondii*, it should be borne in mind that the latter never flies by day, at least that is the experience of all who have collected on the ground with whom I have come in contact; and also that the grass to which *bondii* is attached is dark green in the hottest summer.

Messrs. Humphreys and Westwood (vol. i. p. 244, and plate, 1843) give a figure of an insect with narrow pointed wings, purporting to represent *morrisii*. The wings are all four of the same colour, namely, pale ochreous whitish, toned with pale reddish brown towards the margins, with two faint transverse lines, but no dotted second line. The letterpress says that the fore wings, hind wings, and body are all pale straw-colour, and that the costa is slightly brownish.

Curiously enough, the Rev. F. O. Morris himself published, in 1872, his popular illustrated work on 'British Moths,' in which he made no mention whatever of *morrisii*, but gave an excellent figure of an insect which he called *bondii*, and said that it occurred at Folkestone. He apparently was unaware of the Lyme Regis locality discovered in 1863 by my old friend Percy Wormald.

Folkestone, September, 1897.

Errata in original { * For "wings underneath" read "under wings."
† For "be" read "lie."

SYNONYMIC NOTES ON AQUATIC RHYNCHOTA.

By G. W. Kirkaldy.

I am aware that this paper will not meet with approval from many Rhynchotists, owing to the number of nomenclatural changes it necessitates; nevertheless, I believe that such changes are, in the end, for the good of science, and that therefore the sooner they are done the better.

Fam. Hydrometridæ.

1. Hydrobates, Erichson, 1848, is preoccupied by Boie (Aves, 1822), and also by Vieillot and Temminck (Aves—Cuculidæ and Anatidæ); it will be therefore necessary to employ Cylindrostethus, first characterized by Fieber, Europ. Hem. 33 (1861); as, however, no species was there assigned to it, one must write *Cylindrostethus*, Mayr, that author being the first to adopt a species.

The synonymy can therefore be thus stated:—

Cylindrostethus, Mayr, Verh. zb. Ges. Wien xv. 444 (1865), (Fieb. Europ. Hem. 33, 1861).

= *Hydrobates*, Erichs. in Schomb. Faun. Brit. Guiana, 614 (1848) [nec Boie].

Type. *Hydrobates linearis*, Erichs., *l. c.* 614.

2. The following species of *Gerris*, mentioned in Stephens's Syst. Catal. Brit. Ins. ii. (1829), are merely list-names, descriptions not having been published, viz. *aterrima* (353), *brachypteryx* (352), *nana* and *phæoptera* (353), and *thoracica* (352) [not necessarily *thoracica*, Schummel].

In Lethierry and Severin's invaluable Catal. génér., MS. species are not noticed. It would, I think, have been an advantage had these been added, as one often has occasion to examine specimens labelled with unfamiliar names, which may be either MS. or belonging to species the descriptions of which one has overlooked.

3. Fam. Gelastocoridæ, nov. nom. for Galgulidæ.

Type genus. Gelastocoris, nov. nom. gen. for *Galgulus*, Latr., 1802, preoccupied by Brisson (Aves), 1760.

Type. *Naucoris oculata*, Fab., 1798.

4. Fam. Belostomatidæ.

Deinostoma, nom. gen. nov., for *Serphus*, Stål, 1862, preoccupied by Schrank, 1780, and Haliday, 1832. It is a pity that Mayr did not adopt a new name in his Monograph (1871) instead of merely indicating that a change was necessary. The type will of course be *Belostoma dilatata*, Say, and the principal references as follows:—

DEINOSTOMA DILATATUM (Say).

Belostoma dilatata, Say, New Harmony, 38 [1832?]; reprint in Ann. Rep. N. Y. Agric. Soc. 810 (1858), and in Complete Writ. i. 366 (1869); Walker, Catal. Hem. Brit. Mus. viii. 177 (1873).

Zaitha stollii (nec Am. Serv.), Herr.-Schf. Wanz. Ins. ix. 35, pl. 292, f. 897 ♂, f. 898 ♀ (1853) [*fide* Stål and Uhler].

Serphus dilatatus, Stål, Stett. Ent. Zeit. xxiii. 462 (1862); Mayr, Verh. zb. Ges. Wien, xxi. 403 (1871); Uhler, Bull. U. S. Geol. Surv. (2), v. 338 (1876).

5. Fam. CORIXIDÆ.

Corixa annexa (Uhl.), Walk. Catal. Hem. Brit. Mus. viii. 199 (1873), is MS. (*fide* Uhler).

6. *Corixa esculenta*, Motsch., Etud. Entom. v. 77 (1856); there is no description, merely a note to the effect that the ova are used for food in Egypt. A reference to this species is given by Guérin-Méneville, Bull. Soc. Zool. Acclim. iv. 581 (1858). [This date is usually quoted 1857, but as the séance was held Dec. 4th, 1857, it is unlikely that publication took place before 1858.]

7. *Corixa atomaria*, Illiger (Puton), or Germar (Fieber).

This name appears to be MS., as regards the two older authors quoted; the earliest description I can trace is that of Fieber, Bull. Moscou, xxi. (pt. 1), 515 (1848), which is later than that of *C. panzeri*, *l.c.* 515, and also than that of *C. affinis*, Leach, Trans. Linn. Soc. Lond. xii. 18 (1818); this last name—*affinis*—must therefore be used. I am indebted to Dr. Puton for information regarding Illiger, but I fear that with his strong views upon the Law of Prescription, he will not approve of the use to which that information has been put.

The synonymy of *C. affinis* stands at present :—

C. AFFINIS, Leach.

C. affinis, Leach, *l.c. supra.*

panzeri } Fieber, *l.c. supra.*
atomaria }

panzerii } Fieber, Abh. k. böhm Ges. Wiss. (v.) 7, 227,
atomaria } pl. 1, f. 3 and 5 (1851).

panzeri and *affinis*, B. White, E.M.M. x. 61 and 76 (1873).

salina, Thoms., Opusc. Ent. i. 29 (1869).

(var.) *atomaria* var. *conglomerata*, Rey, Rev. d'Ent. ix. 29 (1890).

It is also the *striata* of Panzer and the *graphiptera* of Rambur, and I believe (though Reuter says this equals *C. geoffroyi*, Leach) that it is *striata*, Geoff., Hist. abrég. i. 478, pl. ix. f. vii. (1762), in which case *affinis* would be the type-species of the genus *Corixa*).

I cannot imagine why nearly all my colleagues prefer the spelling Corisa; Geoffroy wrote Corixa, but since his time many erudite authors (from Amyot and Audinet-Serville, 1843) have laboured to show that *Corisa* is the correct orthography; the word is presumably derived from Greek "koris," the stem of which is "kori-"; it is evident therefore that the suffixes "-xa" and "-sa" are both merely ornamental, and equally correct in a grammatical sense; in any case Geoffroy's original orthography should be adhered to.

8. Micronecta, nov. gen. nom., for *Sigara*, Fab. Ent. Syst. iv. 60 (partim), 1794, and Syst. Rhyng. 104 (partim), 1803, et auctt.; neque Fab. Syst. Ent. 691 (1775), neque Gen. Ins. 177 (1776), neque Spec. Ins. 332 (1781).

Type. *Notonecta minutissima*, L. (*Sigara minutissima*, auctt.).

It is extraordinary that Fabricius's genus should have been used so long for the tiny water-bugs of which *Notonecta minutissima* is the representative. It was erected in 1775, Syst. Ent. 691, for one species—*striata*—which the author quoted as *Notonecta striata*, L.; he further cited as a synonym (!) of his genus Geoffroy's *Corixa*. The two genera *Corixa* and *Sigara* are thus absolutely identical, and the fact that *S. minuta* (*minutissima*, L.) was added in 1794 cannot affect this. Thirty-nine species have been described and grouped under the genus, of which four belong to another genus; the remainder represent perhaps twenty-five species.

Summary.

1. *Cylindrostethus* (Fieb.) Mayr, should replace *Hydrobates*, Erichs. (nec Boie). Type: *C. linearis* (Erichs.).

2. *Gerris aterrima*, *brachypteryx*, *nana*, *phæoptera* and *thoracica*, Stephens, are MS.

3. Gelastocoridæ, nov. fam. nom., for Galgulidæ. *Gelastocoris*, nov. nom. gen. for *Galgulus*, Latr. (nec Brisson). Type: *G. oculatus* (Fabr.).

4. *Deinostoma*, nov. nom. gen. for *Serphus*, Stål (nec Schrank). Type: *D. dilatatum* (Say).

5–7. *Corixa annexa*, Uhl., *esculenta*, Motsch., and *atomaria*, Illiger, are MS. *Corixa affinis*, Leach, 1818, should replace *C. atomaria*, Fieb., 1848.

8. *Micronecta*, nov. nom. gen. for *Sigara*, Fab. (1794, in part) et auctt. (nec Fab., 1775). Type: *M. minutissima* (L.).

Sept. 7th, 1897.

DESCRIPTIONS OF SOME NEW SPECIES OF CLYTHRIDÆ AND EUMOLPIDÆ.

By Martin Jacoby, F.E.S.

Tellena angusticollis, n. sp.

Elongate, subcylindrical, metallic green; antennæ black; thorax narrowed in front, closely and finely punctured; elytra extremely closely punctured and finely rugose. Length 8–10 mill.

Head rather closely and finely punctured, with a deep depression between the eyes, the latter elongate, notched at the inner margin; labrum and mandibles black; antennæ, scarcely extending beyond the base of the thorax, black, the first joint metallic green, the following two joints also stained with metallic blue, very small, the others strongly serrate; thorax twice as broad as long, the sides rounded and distinctly narrowed in front, with a narrow reflexed margin, the surface closely impressed with fine and larger punctures; scutellum very broad, finely punctured; elytra more closely but scarcely more strongly punctured than the thorax, the interstices finely transversely wrinkled; under side metallic green, like the upper surface, but clothed with fine grey pubescence, thickly so on the abdominal segments; legs long and slender, the tarsi black, claws bifid.

Hab.—Brazils, St. Paulo.

This species has no doubt been confounded with the only other one which constitutes the genus, but it is quite distinct, although the resemblance is very great.

Lacordaire, who has described the type *T. varians*, has already drawn attention to the great variability of the insect, and says that one could easily separate two species, if only the extreme forms were before one; but he only founded these remarks on the sculpture of the thorax and the elytra; and it is probable that he overlooked the shape of the thorax, although this is difficult to imagine in an author so experienced as Lacordaire. In any case, I have before me three specimens, which not only differ in the finely rugose elytra, of which I cannot see a trace in the typical form, but in which the thorax is distinctly narrowed in front, the same part in *T. varians* showing an equal width in all the specimens I have for examination, so that the thorax may almost be described as transversely subquadrate. This, I think, justifies my separating the two insects, especially as it is not a solitary case.

Urodera lacordairei, n. sp.

Black, closely pubescent below; antennæ and legs fulvous; thorax very closely punctured, transverse; elytra finely punctate-striate, the interstices sparingly punctured, the sides, base, and apex with a narrow fulvous band extending inwards to the middle of the suture. Length 6 mill.

Head nearly flat, slightly bronze-coloured, very closely and finely punctured, scarcely depressed between the eyes; antennæ extending very nearly to the base of the thorax, entirely fulvous, the apical joints slightly darker, the fourth and following joints broadly transverse; thorax twice as broad as long, convex, the sides rounded, the median lobe strongly produced and truncate, the surface very closely and finely punctured throughout; scutellum impunctate; elytra not narrowed posteriorly, rather regularly and finely punctate-striate, the interstices with a few very fine punctures only here and there; the shoulders not prominent; the disc black, with a slight æneous gloss, margined with a narrow band of fulvous, which is more or less interrupted at the sides below the middle, where it is also much narrowed, leaving part of the lateral margin of the ground colour, from the basal margin, this band extends obliquely downward towards the suture, where it ends near or below the middle; under side thickly clothed with yellow pubescence; legs fulvous, tarsi fuscous, moderately robust; mesosternum truncate at its apex.

Hab.—Brazils, Maranos.

This species can only be compared to *U. hamatifera*, Lac., which it entirely resembles in regard to the pattern of the elytra, but the fulvous antennæ and legs will at once distinguish it; the thorax in the present insect is also much broader and more distinctly punctured; the apical fulvous mark is in shape of an ovate spot. It is the only species of the genus having fulvous-coloured legs. Two specimens are contained in my collection.

Glyptoscelis gigas, n. sp.

Elongate, subcylindrical, piceous, covered with white pubescence; thorax broader than long, marked with three white bands; elytra finely rugose, with longitudinal bands of white pubescence of variable width. Length 12 mill.

Head closely covered with white pubescence, impressed with a narrow central groove; the epistome not separated from the face; labrum and palpi piceous; antennæ extending slightly beyond the base of the elytra, piceous, the second joint half the length of the third, this and the fourth joint equal, terminal joints slightly shorter and thickened; thorax subcylindrical, one half broader than long, the sides slightly rounded at the middle, the posterior margin broadly but moderately produced, the disc very closely and finely rugose-punctate, the pubescence forming a broad band at each side and a narrow one at the middle of white hairs or scales; scutellum broader than long; elytra slightly transversely wrinkled here and there, everywhere clothed with short scale-like white hairs, forming narrow longitudinal bands, with a broader and more conspicuous one at each side, below likewise densely pubescent; the legs slender, the claws bifid; the inner division very short.

Hab.—Brazils.

This is not only the largest species of the genus, but of the whole of the group Myochroinæ, to which *Glyptoscelis* belongs. The single specimen I have seen is contained in the collection of the Oxford Museum, and was obtained by Myers, without particular locality being given.

GLYPTOSCELIS PARAGUAYENSIS, n. sp.

Elongate, subcylindrical, obscure æneous; antennæ and legs obscure fulvous; thorax very finely punctured, clothed with whitish hairs; elytra more strongly and distantly punctate, greenish-æneous, clothed with white and fulvous pubescence, the apex of each not produced. Length 6 mill.

Head closely covered with whitish and fulvous hairs; labrum fulvous, shining; eyes deeply emarginate; antennæ fulvous, extending beyond the base of the elytra, the basal joint blackish, the second short, the third longer than the fourth joint, terminal joints widened (the last three joints wanting); thorax subcylindrical, nearly twice as broad as long, the sides rounded at the middle, narrowed near the base and apex, the anterior angles pointed, the disc closely and rather strongly punctured, piceous, closely covered with white and yellowish hairs placed transversely, the middle with a feeble ridge; scutellum subquadrate, with a few hairs; elytra greenish æneous, more strongly and distantly punctured than the thorax and similarly pubescent, the pubescence forming small white or fulvous very indistinct patches, the apex of each rather truncate; under side and legs thickly pubescent, claws deeply bifid.

Hab.—Paraguay.

This species differs from *G. æneipennis*, Baly, in the want of the elytral transverse rugosities, and in not having their apex produced into a point; *G. fascicularis*, Baly, is larger, and has four pubescent thoracic bands; and *G. cryptica*, Say, is of a non-metallic colour, and has also pointed elytral apices and simple claws.

MYOCHROUS CURCULIONOIDES, n. sp.

Dark fuscous, clothed with yellowish scale-like pubescence; antennæ dark fulvous; thorax subcylindrical, projected anteriorly, rugose-punctate and pubescent; elytra coarsely and closely punctured, the interstices wrinkled throughout, the sides and apex yellowish; femora with a short tooth. Length 6 mill.

Of elongate and subcylindrical shape; the head perpendicular, finely rugose, and clothed with short yellowish pubescence in shape of scales; labrum and palpi fulvous; antennæ not much extending beyond the base of the thorax, fulvous, the terminal five joints broadly widened at the apex only, the third and the following two joints elongate, nearly equal; thorax subcylindrical, the sides forming a distinct tooth before the middle, the anterior margin strongly produced at the middle and forming two elevations at the top, the intermediate space of which is depressed, the surface strongly and closely rugose, clothed with yellowish scales at the sides, forming an ill-defined band; elytra much wider at the base than the thorax, closely impressed with large round punctures, the interstices everywhere rugose or wrinkled, clothed with dark and yellow scales, which near the apex form a transverse distinct band, some smaller yellowish spots are also seen near the shoulders and below the base; under side black, similarly clothed with yellowish scales; all the femora armed with a short tooth, the anterior ones very obsoletely so.

Hab.—Bahia.

The specimen contained in my collection was named as above by the late Lefèvre, but has not been described to my knowledge.

NOTES AND OBSERVATIONS.

Lepidoptera Phalænæ of the Whole World.—The Trustees of the British Museum have sanctioned the publication of a series of volumes on the Moths of the world, and the commencement of this important work will be undertaken by Sir George Hampson. It will comprise synopses and descriptions of the families, genera, and species of Moths, and include every described species about which exact information is obtainable. The type of each genus will be indicated, and full details regarding the geographical distribution of the species will be given. There are to be figures in the text illustrative of each genus and prominent section thereof, and the structural characters upon which the genus is founded will be shown. The general arrangement of the work will be based on the lines of classification recently brought most prominently before us by Mr. E. Meyrick in his 'British Lepidoptera.' There is probably no question about the system upon which Meyrick's classification is founded being valid, and taken as a whole his arrangement of groups and families appears to be a natural one. As regards the composition and sequence of genera, however, it would seem that both are open to judicious revision. It is further proposed to issue, in parts, an atlas of coloured plates giving half figures of as many as possible of the species which have not previously been satisfactorily figured, especially of "types" in the British Museum. We are very pleased to learn that the Museum authorities have determined on this step, as a work of such a comprehensive character produced under their auspices must do much towards establishing something definite in the way of classifying the old-style Lepidoptera-Heterocera, and at the same time bring entomologists into line on the question of nomenclature.

British Mymaridæ.—In the September number of 'Knowledge' there is a highly interesting article by Mr. Fred Enock on "Fairy Flies" (Mymaridæ). These hymenopterous atoms have not received very much attention from entomologists; but, as Mr. Enock suggests, "One reason for this want of attention is, no doubt, because of the extreme smallness of the members of this family, the largest being not more than one-twentieth of an inch long, whereas the smallest is less than one-eighty-fifth of an inch from head to tail." Dr. Sharp ('Insects,' pt. i. p. 538) says: "Probably Mymarides may all prove to be dwellers in eggs of other insects"; and as regards the British species, it would appear that Mr. Enock believes this to be the case, as he states: "All the species are egg parasites, and each species has its peculiar taste, selecting with unerring instinct the right kind of egg—generally that of an injurious insect—in which the female lays one of its own eggs, which in due time hatches or develops into an active maggot." The number of British species is given as thirty-five, and these are distributed among the eleven genera as follows:—*Ooctonus* (4), *Gonatocerus* (5), *Alaptus* (2), *Litus* (1), *Eustochus* (1), *Mymar* (1), *Cosmocoma* (8), *Caraphractus* (1), *Anaphes* (7), *Anagrus* (4), *Camptoptera* (1).

Rearing Bombyx rubi.—As a rule, considerable difficulty is experienced in obtaining imagos of this species from larvæ that have to be kept in confinement throughout the winter. In an interesting article on rearing *B. rubi* (E. M. M., Sept., pp. 199–201), Mr. Robson tells us that he collects the larvæ during fine sunny days in the early months of the year, and so avoids the trouble of preparing hybernating quarters for them. Instead of putting the larvæ together in a breeding-cage, he encloses each one in a separate paper box about two inches square. The results appear to be very satisfactory.

Destroying Insects by Steam Power.—In America, machines constructed something on the plan of a steam fire-engine are employed to repel the attacks of insects on the foliage of shade trees, and the attention of growers of fruit on a large scale is called to this new method of dealing with insect pests. For further particulars and illustrations of these engines of destruction, the reader is referred to a pamphlet on the subject, entitled, 'The Use of Steam Apparatus for Spraying,' by L. O. Howard, Ph.D.

Studying Neuration without Removing the Scales of the Wings.—In an article on this subject ('Canadian Entomologist' for August), Professor Skinner points out that in the present day "Neuration can be studied with the greatest ease and accuracy, and permanently recorded in a photograph, or, more strictly speaking, a radiograph. The anatomy of a living chrysalis may be studied without removing the cocoon, and also the internal anatomy of the thorax and abdomen can be fairly well seen, and in time the process may be improved for this work. With the aid of the Röntgen or X-rays and the photographic plate one could make a picture of the neuration of the beautiful, rare, and curiously shaped *Ornithoptera paradiseæ*, and not disturb a scale on its superb wings. With the fluoroscope one could doubtless see all the neuration without even going to the trouble of making a picture."

Photography without Shadow.—Some time ago the 'Canadian Entomologist' gave a method of photographing insects without shadow. It was done by fixing the camera in a perpendicular position so as to look down upon a sheet of glass placed horizontally below, and beyond that a white screen, the insect being pinned to a small piece of cork attached to the glass. By this process the shadow was thrown through the glass on to the white screen at an angle quite out of the line of vision. Now I believe that professionals find considerable difficulty in adjusting their heavy apparatus to the perpendicular position, and I therefore suggest that it can be done quite as effectively by using the camera horizontally, and placing the insect on a piece of cork fixed to a perpendicular sheet of glass, with a white screen, also perpendicular, a short distance behind it. I tried the experiment the other day, and the result was perfectly satisfactory,—the shadow fell upon the screen some inches to the side of the object.—H. G. Knaggs; Folkestone, September, 1897.

Strange Resting-places of Pieris rapæ and Satyrus semele.—During one of the brief periods of sunshine with which we were favoured on some of the later days of August, I had occasion to leave one place of business in a busy London thoroughfare, and proceed to another some hundred yards or so further on in the same street. On my way I happened to meet an acquaintance with whom I stood talking for perhaps ten minutes, during which time the sun became obscured by clouds. I was wearing an ordinary straw hat at the time, and on reaching my destination and hanging my hat on a peg, I was not a little surprised to find a female *Pieris rapæ* resting upon it. The butterfly was certainly not on the hat when I started on my journey, and I have no doubt that it settled there when the sun ceased to shine, selecting the hat as a secure resting-place by reason of the similarity of its colour to that of its own under side. Earlier in the month I had been staying at Bournemouth, and had spent many hours on the heaths and downs of the adjacent coasts, frequently being accompanied by my son. Both of us were in the habit of wearing grey flannel trousers, and I was much struck by the persistent way in which *Satyrus semele*, which was exceedingly abundant at the time, rested upon them almost whenever we stood still for a few moments, often returning again and again when driven away. I have little doubt that in this case also the similarity of the colour of the material rested upon to that of the part of the insect most exposed when at rest was the attraction.—Robt. Adkin; Lewisham, September, 1897.

Varieties of Melanippe montanata.—At a meeting of the South London Entomological and Natural History Society, held on August 12th last, Mr. J. N. Smith exhibited a specimen of *M. montanata*, in which the ground colour was heavily suffused with leaden grey; this was one of a pair of similar aberrations of the species taken June 10th, 1895, by Mr. Fitzgerald in a lane near Dursley. A somewhat similar specimen, from Longleat, in Wiltshire, is figured in the 'Entomologist' for 1881 (xiv. pl. 1, fig. 20).

Variety of Catocala nupta.—On August 3rd there emerged in my breeding-cage a variety of *Catocala nupta*, having the usually red portions both of the upper and under sides of the hind wings brown, with perhaps a very faint tinge of red. The larva was found on willow in the garden here.—E. V. Hall; 4, The Avenue, Brondesbury, N.W.

[Similar aberrations of this species have been obtained in the London district before (see Entom. xxv. 243, and xxix. 315). There is also an example, taken on August 10th, 1895, on Wandsworth Common, in the National Collection at South Kensington.—Ed.]

Variety of Nemeophila plantaginis.—About the middle of last June, I took a fine male specimen of *Chelonia* (*Nemeophila*) *plantaginis*, flying on the moors at Penmaenmawr, North Wales, in which the ground colouring of the *hind* wings is quite white instead of bright orange, but with the normal black markings.—J. B. Morris; Maldon House, Maldon Road, Wallington, Surrey, September 22nd, 1897.

Vespa crabro.—I should be greatly indebted for any information afforded respecting the numerical strength of a hornet's nest. Though there must be many nests in this neighbourhood, I doubt whether any one nest contains more than one hundred or so. This formidable insect occurs in such plenty here this season as to prove a positive source of danger, and the fruit crops, especially the apples, suffer accordingly. Only a few hundred yards from the Vicarage, along the Stoke and Nayland Road, are two cottages under one thatched roof, inhabited respectively by two families related to each other, and comprising jointly probably about fifteen children. In the side of the thatch of the first cottage there is a hornet's nest; and in the thatch of a low outhouse, on the further side of the second cottage, there is another. It goes without saying that the time-honoured, and as a rule the best, plan for suffocating the inmates, by the application of a folded linen rag, alternating with layers of sulphur, and then set light to, cannot be adopted here, as the thatch would speedily be in a blaze; and moreover, in the case of the nest in the outhouse, it is believed to be several feet distant from the only hole of entrance, at the far end possibly of the old run of a rat, as the booming sound made by the insects is distinctly heard close to the rear of the building. The suspension of wide-mouthed bottles, containing a compound of sugar and beer, to the sides of the cottage and outhouse, has not been without the desired effect, as several hornets have crawled in, and got drowned. But this is only a partial remedy, and the wasps that have met a similar fate therein (many of them tree wasps, if I am not greatly mistaken) are far more numerous. Another method was for the father of one of the families, to whom I lent my insect net for the purpose, to catch them as they flew out and in; but this speedily had the natural effect of rendering them furious. I then suggested what seemed to me to be the only available method, namely, the insertion of a piece of lead piping in the hole, so that the hornets must pass through it on their way to the outer air, and the fixing at the same time of the other end of the said piping well into the neck of the aforesaid bottle (now suspended for the purpose close underneath). By this means many have been caught and drowned, including the queen, who may have only quitted the interior on the supposition, or intimation, that something was wrong. The nest in the outhouse has thus been considerably weakened, but the second nest still remains to be tackled. It cannot be seen to at present, as the cottagers are all so busily employed in getting in the harvest. There is also a third nest, within the distance of a short half-mile, down another lane, in the tiled roof of a cottage opposite the short cut across the fields to Boxford, and here the hornets, to reach their hole, crawl along the leaden gutter under the eaves. A fourth nest, situate in the root of a tree in Assington Park, was taken and destroyed several days since. Owing to the number of hornets that fly in and out of the numerous oaks in the wood known here as Assington Thicks, I feel convinced that there are several more nests undiscovered as yet,—probably in the hollows of some of the above-mentioned oaks. There is a little summer-house or shanty in this wood, for the gamekeepers to shelter when it rains, and for several seasons past hornets have suspended a nest from the interior of its ceiling, flying in through the open pane of glass in its side. This year, however, they have not put in an appearance there. I believe one such nest in the shanty was cut down, and presented to the museum at Colchester.

During my short sojourn at this vicarage I have captured twelve hornets with my net as they came successively to regale themselves on the sap exuding from the trunk of an oak in the back shrubbery. I note that there is hardly ever more than one hornet at a time, either where the sap exudes or on a partially devoured apple. Probably there is not room for the operations of both. But if one be captured thereat, within a brief space (say ten minutes) another visitor, in brown and yellow jerkin, flies up with a sonorous hum to take his place. Sometimes, but more rarely, two may be seen together seated on one apple. Are these solitary visits due to some well-understood and defined arrangement between themselves? The present unsettled state of the weather here (sunshine alternating with clouds and frequent showers) renders the hornets all the more dangerous, as apt to creep about noiselessly in a semi-torpid condition resulting from the heavy wet. Query, do the queens leave the nest at this period of the year? It would seem so, as when my wife was in the orchard here a few days since, on picking up a fallen apple, she heard a loud buzzing in the grass close to the fruit, and in a few moments a hornet ascended a blade of grass and flew away. Luckily for herself she did not touch it, as at first sight she mistook it for a dragonfly, and from the size which she described it could only have been a queen.

Of late years, I have seen very few hornets in England, and during the whole of my residence in my Cambridgeshire parish I only recall the occurrence of one nest in the roof of a farmhouse or cottage three or four doors from the rectory, and taken by an elderly parishioner to whom various odd jobs were delegated, and commonly supposed to possess a very thick cuticle, at any rate he went about his work fearlessly. "They do *hom* so," he said. One of the very few occasions on which I have seen a queen hornet alive was in the winter season on the drawing-room window-sill of the said Cambridgeshire rectory, when it was in an almost torpid state, and covered with soot, and I naturally dreaded its presence on account of my children, who were then very young. I remember in boyhood's hour being greatly diverted at beholding an hornet sweep in its flight into a hole in the side of a large jargonelle pear, and no fewer than twenty wasps forthwith to tumble out therefrom in a state of the most abject terror to the ground. In those days also a relative observed a hornet seated on the bough of an apple tree, and tearing a hive bee to pieces for the sake of its honey-bag. The hornet does not always score, however, for while two English ladies were walking in the environs of Chexbres (Lake of Geneva) in the month of July, 1893, while I held the chaplaincy of that place, they recounted to me how a wasp and hornet dropped struggling together from an orchard tree in front of them, and how the wasp, being more agile, managed to dart about and sting his adversary here and there until the latter succumbed.—(Rev.) F. A. WALKER; Assington Vicarage, near Colchester, August 24th, 1897.

CAPTURES AND FIELD REPORTS.

Colias edusa in Dorsetshire.—One specimen captured at Swanage (*vide* Mr. Hall's note, p. 272).

Colias edusa in Cornwall.—I saw two specimens as I drove from Truro on Aug. 13th, and a day or so later a young friend showed me one that he had caught, saying that he had seen several. I do not know if the species has been recorded from other parts this year. I have not seen it for some years.—(Rev.) J. A. Mackonochie; St. Columb, Cornwall.

Colias hyale and C. edusa in Sussex.—Last Tuesday I took a female *C. hyale* near here, in a meadow close to a clover-field; in this same clover-field, about a fortnight ago, I caught a female *C. edusa*, and saw two males.—L. G. S. Raynor; Hill View, Bognor, Sept. 10th.

Colias edusa in Essex.—Towards the end of August, my friend Mr. C. O. S. Hatton and myself made several morning visits to a very fine field of lucerne situated in this parish, and belonging to Mr. E. A. Fitch. The second brood of *Strenia clathrata* was very abundant, and we captured several interesting varieties. On Aug. 26th, almost immediately after entering the field, Mr. Hatton found a male *C. edusa*, resting on a lucerne stem. It was such a fresh specimen that I think it was undoubtedly bred on the spot, especially as within the next hour I captured two other examples, one male and one female, in the same part of this large field, whereas we did not see any more specimens, either on that or on any other day. We much regretted afterwards that we did not search for the empty pupa-case of the first specimen.—(Rev.) Gilbert H. Raynor; Hazeleigh Rectory, Maldon, Sept. 11th, 1897.

Colias edusa in the Isles of Scilly.—*C. edusa* was fairly common in the Isles of Scilly during the month of August, the earliest date being Aug. 2nd, but only one var. *helice* was taken.—B. W. Adkin; Brandon House, Morden Hill, Lewisham, S.E.

Colias edusa in the Isle of Man.—On 30th July last I captured a fine male specimen of *C. edusa* in an old gravel pit at Ramsey, Isle of Man. Is this not a rather northerly locality for this species?—(Rev.) B. Harvey-Jellie, B.A.; St. Helens.

[*C. edusa* has been recorded from Orkney.—Ed.]

Colias edusa in Hampshire and Kent.—I saw a specimen on the coast at Lymington on Aug. 7th, and I have heard of a specimen being seen at Folkestone on Sept. 1st.—W. J. Lucas; Kingston-on-Thames.

Vanessa antiopa in Yorkshire.—A specimen of *V. antiopa* was seen in Beedale, a beautiful wooded valley seven miles from Scarborough, on Aug. 9th. I have been at some pains to verify the record by communication with those who were actually on the spot and saw the insect, I myself being only a few yards distant, and feel no doubt as to its genuineness.—James H. Rowntree; Westwood, Scarborough, Sept. 15th, 1897.

Acherontia atropos in Suffolk.—A larva of *A. atropos* was recently found in a garden here. It was nearly full grown at the end of July.—Edward Ransom; Sudbury, Suffolk, September, 1897.

Deilephila galii in Devon.—Mr. Bontnall (E. M. M., Sept., p. 212) records the capture of a larva of this species at Starcross, on Aug. 7th last.

Chœrocampa celerio in Cambridge.—A female example of this species was taken in the town on the 4th, and given to me on the 6th Sept. As it had passed the intervening time in a match-box, it was considerably damaged.—J. C. Rickard.

Sphinx convolvuli in London.—In Piccadilly, on the night of Sept. 14th, quite an interested crowd gathered to witness the capture of a single specimen of this moth. When taken it bore unmistakable evidence of having been handled roughly. It may possibly have been conveyed to this district by some vegetable cart; being attracted by light, it fell a victim to Mr. W. Henry Barton. The last captures of this insect were in 1887, when two fine specimens were taken, at rest, on a fence at Hammersmith Bridge, but were, I believe, not then notified.—H. W. Bell-Marley; Ravenscourt Park.

Sphinx convolvuli in Wiltshire.—Yesterday (Aug. 31st) a fine specimen of *Sphinx convolvuli* was brought to us by a neighbour, who had found it at rest on his house-door, probably attracted by the flowers in the garden.—Cecil M. Gummer; Swayne's Close, Salisbury, Sept. 1st, 1897.

Sphinx convolvuli in Suffolk.—On Aug. 19th I had a specimen of *S. convolvuli* brought to me which had been found clinging to the wall of a house here.—Edward Ransom; Sudbury, Suffolk, September, 1897.

Sphinx convolvuli.—On Friday, Sept. 3rd, two fine specimens of *S. convolvuli* were observed in the garden here. They were flying, about 7.30 p.m., over a bed of tobacco plant (*Nicotiana affinis*). — M. Alderson; Park House, Worksop, Notts.

Sphinx convolvuli in the Isles of Scilly.—While staying in the Isles of Scilly during the month of August and the first few days of September, my friend Mr. Whiffen and myself took seventeen specimens of *S. convolvuli* in rather worn condition, hovering over flowers.—B. W. Adkin; Brandon House, Morden Hill, Lewisham, S.E., September, 1897.

Note on Stauropus fagi.—I have a nice lot of larvæ of *S. fagi* from ova deposited on Aug. 5th. These commenced to hatch on Aug. 13th, and were only eight days in the egg state. The spring brood were sixteen days in the egg stage.—W. E. Butler; Hayling House, Reading, Sept. 11th, 1897.

Larva of Eupithecia pumilata feeding on Holly Flowers.—When at Oxshott, on Whit Monday last, I obtained, among holly flowers, a few larvæ of a species of *Eupithecia* which I did not recognize at the time, but on June 26th and three following days they produced specimens of *E. pumilata*. I know that the larva of this species will feed on the blossom of many kinds of plants, but I do not remember to have seen any record of its having been found on the flowers of this shrub.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

Note on Acidalia inornata.—On July 6th last I captured a female *A. inornata* at Oxshott, and she deposited about forty eggs. The larvæ hatched in due course and were supplied with knotgrass. About two-thirds of the number fed up rapidly and pupated, the first imago appearing on Sept. 4th. The remainder of the larvæ evidently intended to hybernate from the first, as they were only about half grown when the major portion of the brood pupated, and they have not increased at all in size since that time. So far as I can see they do not eat the fresh food with which they are provided, but seem to prefer the withered sprays that are allowed to remain on the suface of the earth in their cage. At the present time they appear active enough, as whenever the cover of their cage is removed, and the *débris* at the bottom gently blown upon, each individual at once indicates his presence by a quick swaying movement of the anterior segments.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

Abraxas grossulariata, var.—The most interesting form of *A. grossulariata* I have seen this year is one I took here, in which the usual orange band on the fore wings is diffused towards the anal angle. The band is continued on the hind wings, being very distinct on the inner margins. In these respects the moth bears a faint resemblance to *A. sylvata.*—Alfred Sich; Villa Amalinda, Burlington Lane, Chiswick, July 5th, 1897.

Food-plants of Plusia gamma and Hadena trifolii. — Larvæ of *Plusia gamma* have been noted this season feeding on a large variety of plants. I had three or four that were found on lime. Mr. W. E. Butler informs me that he has observed them feeding on the pods of scarlet runner beans. Mr. Butler also notes larvæ of *Hadena trifolii* (*chenopodii*) eating the young leaves of onions.—R. S.

Plusia moneta in Surrey.—I took two specimens of *P. moneta* in a garden here at the end of July, and about the same time a specimen of *Smerinthus populi* in pretty good condition.—J. B. Morris; Maldon House, Maldon Road, Wallington, Surrey.

Eugonia (Ennomos) autumnaria (alniaria) at Chichester.—I have to record the capture of a male specimen of *Eugonia autumnaria* (*alniaria*) here on Sept. 5th. It was taken settled in the road in the daytime, by the Rev. H. Housman, who kindly gave it alive to me.—Joseph Anderson, Jun.; Chichester.

Notes from Sussex.—At the end of August last I beat a full-fed larva of *Stauropus fagi* from hazel, which in a few days spun up in the cage between two oak leaves. The Diurni appear to have been by no means plentiful about here this season. Sugar, however, has proved very attractive, and the commoner Noctuæ I have noticed in enormous numbers.—Wilfrid J. Andrew; Hawthorn Villa, West Hoathly, Sussex, Sept. 17th, 1897.

Entomology in Merionethshire (continued from page 248).—

Neuroptera-Odonata: Dragonflies on the whole were unusually scarce, though diligently sought for, only six species being met with. *Cordulegaster annulatus* occurred sparingly, both at Barmouth and Tan-y-bwlch; I did not encounter it elsewhere. *Orthetrum cærulescens* was fairly plentiful at Tan-y-bwlch, but only one came under notice at Barmouth. All the examples taken were females, with the exception of a solitary male. A single *Æschna grandis* was noticed flying over the heather at Tan-y-bwlch. *Pyrrhosoma minium* and *Agrion puella* swarmed at Tan-y-bwlch, but were in much less numbers at Barmouth.

Coleoptera: Several species of Elateridæ and Brachelytra were found washed up by the tide, the names of which I have not, so far, definitely ascertained. *Timarcha lævigata* was common, crawling over mountain paths at Barmouth.—Augustus D. Imms; "Linthurst," Oxford Road, Moseley, Worcestershire, September, 1897.

Collecting at Swanage, Dorset.—Butterflies seem to have been very plentiful this year, some species being more than usually abundant. The following species were found during a five weeks' stay, Aug. 5th to Sept. 9th:—*Pieris brassicæ, P. rapæ, P. napi, Colias edusa* (one), *Argynnis aglaia, Vanessa urticæ, V. atalanta* (very abundant; twenty-five were counted on one rubbish-heap), *Pyrameis cardui* (plentiful; I took four in about five minutes one morning), *Melanargia galatea* (fairly common, but rubbed), *Epinephile ianira, E. tithonus, Satyrus* (*Hipparchia*) *semele, Cænonympha pamphilus, Pararge* (*Satyrus*) *megæra* (all common), *Thecla quercus* (two), *Lycæna astrarche* (*agestis*), *L. icarus* (both common), *L. bellargus, L. corydon* (common, but local), *L. minima* (only two or three), *L. argiolus, Polyommatus phlœas, Hesperia thaumas* (a few worn specimens), *H. actæon* (plentiful). Not many moths were obtained, but *Macroglossa stellatarum* was abundant, at the flowers of geranium mostly, and also found at fuchsia. *Plusia gamma* swarmed everywhere, in fields, gardens, &c., coming especially to geranium and fuchsia. *Zygæna filipendulæ* was common; also *Aspilates ochrearia* and *Phlogophora meticulosa.* Two or three *Bombyx* (*Lasiocampa*) *quercus* were seen, one *Bryophila muralis* on a pine-tree, and one *Amphipyra pyramidea.* Larvæ of *P. brassicæ* and *P. rapæ* on nasturtium, *Euchelia jacobææ* on ragwort, and *Phalera bucephala* were common; and three larvæ of *Sphinx ligustri* were obtained.—E. V. Hall; 4, The Avenue, Brondesbury, N.W.

Rhopalocera at Llandudno.—On Aug. 25th I revisited an old collecting-ground on the Conway Shore, Llandudno, where I remembered taking insects in 1884. Thermometer 75°, sunshine, blue sky with cumulus clouds, gentle breeze, sea calm. The ground, a portion of which had been used for golfing since my previous captures, was sandy, covered with thistles, teasels, and low herbage. The first insect I noticed was *Lycæna icarus,* a pair of which, evidently not recognizing an entomologist, fluttered round me repeatedly as I stood. *Satyrus* (*Hipparchia*) *semele* was abundant, in all conditions, from the perfect specimen to the bleached and battered veteran. *Epinephele ianira,* which formerly I had observed abundantly at this collecting-ground, was conspicuously absent, nor were any Vanessas seen, although *V. cardui, V. io,* and *V. urticæ* had all occurred here in 1884. One or two specimens of a Noctuid were dashing about (probably *Plusia gamma,* but too active to be identified with certainty). Other butterflies seen were *Pararge* (*Lasiommata*) *megæra, Cænonympha pamphilus, Polyommatus phlœas,* and *Lycæna astrarche* (*agestis*).—Graham Renshaw; Vale Bridge House, Vale, Cheshire.

Dragonflies around Birmingham in 1897.—During the past season Odonata were very plentiful in point of numbers, but a poor selection of species was met with. The best locality proved to be a large pond at Earlswood (nine miles distant from the city), over which, on a hot and bright day, enormous numbers of these insects were to be seen. About this pond *Libellula depressa* was the commonest species, though elsewhere it only occurs sparingly. *L. quadrimaculata* was scarce, being only observed here twice, and once near Hockley Heath, a few miles distant. *Æschna grandis* undoubtedly was the commonest of the larger species, it being met with in a variety of situations throughout the district; it was especially abundant over the commons in Sutton Park (N. Warwickshire), where also *Æ. cyanea* was plentiful. This last species is sometimes seen careering wildly about the streets of Birmingham. *Cordulegaster annulatus,* though usually considered a local insect, is widely distributed over this district, but never in considerable numbers. *Calopteryx splendens* was plentiful amongst rank herbage about a brook at Hockley Heath. *C. virgo* is also common, but I did not meet with it this year. *Pyrrhosoma minium* and its companion *Agrion puella* were both about in immense numbers. On several occasions *Æschna grandis* was observed ovipositing, sometimes on the leaf of a water-lily, and at other times thrusting its abdomen some distance below the surface of the water, the eggs on this occasion being attached to the stem of the plant. Once I noticed the insect fasten its eggs under the leaf of the plant; during this process it almost entirely submerged itself, While oviposition was taking place the female always contracted her long slender abdomen into the form of a loop, the reverse to *Libellula depressa,* the structure of whose abdomen seems only adapted to be kept fairly rigid; being broad and flat, it certainly does not admit of such extreme contraction.—Augustus D. Imms; "Linthurst," Oxford Road, Moseley, Worcestershire, September, 1897.

Captures in Essex.—The following is a list of Lepidoptera that I have taken during the present season. Unless otherwise stated, Benfleet is the locality:—*Leucania obsoleta*, June 24th, at sugar. *Ditula hartmanniana*, June 26th, several on fences near osiers. *Elachista triatomella,* June 26th, flying over meadow-grass, and settled on the railway fence. *Penthina gentiana,* June 27th, several bred from teasels. *Aplecta advena,* June 28th, at sugar. *Ceratophora inornatella,* June 28th, a few on sugared reeds. *Cnephasia politana,* June 28th, netted. *Coleophora anatipennella,* June 30th, one or two on the wing. *Acontia luctuosa,* June 30th, 10.45 p.m., flying round one of the lamps at Benfleet station. *Antithesia salicella,* July 3rd; this fine tortrix common among osiers. I don't know whether this species or *P. curtisellus* more closely resembles the excrement of a bird; when at rest on a fence the likeness in each case is remarkable. *Agrotis corticea,* July 3rd, at sugar, a rare moth in these parts. *Leucoma salicis,* July 3rd—Aug. 4th, at gas-lamps, Southend. *Eupœcilia angustana,* July 6th, at rest. *Orthosia upsilon,* July 9th, at sugared blackthorn, but osiers quite near. *Rhodophœa advenella,* July 29th, at light, Benfleet Station. *Nonagria neurica,* July 31st and Aug. 7th, at sugar. *N. geminipuncta,* Aug. 14th, bred, and taken at sugar. *Homœosoma senecionis,* Aug. 5th, a few from larvæ collected at Leigh July 12th. *Apodia bifractella* (Aug. 15th), and *Ptocheuusa inopella* (Aug. 18th), on heads of *Inula* at Leigh. *Plusia festucæ,* July 18th, at sugar. The season here has been a good one, not equal to the last, but still better than that experienced in many districts.—F. G. Whittle: 3, Marine Avenue, Southend, Sept. 1st, 1897.

[*Homœosoma senecionis,* Vaughan, is now generally considered to be synonymous with *H. cretacella,* Rössler; *vide* Entom. xxiii. 365.—Ed.]

SOCIETIES.

South London Entomological and Natural History Society.—*July* 22*nd*, 1897.—Mr. A. W. Dennis in the chair. Mr. Ashdown exhibited a living specimen of the rare and local Longicorn, *Oberea oculata*, taken at Wicken Fen. Mr. Kedgeley sent for exhibition a specimen of the dragonfly *Æschna cyanea*, which had been taken in the Borough on July 18th.

August 12*th*.—Mr. R. Adkin, F.E.S., President, in the chair. Mr. McArthur exhibited a fine bred series of *Toxocampa craccæ* from North Devon. Mr. Edwards, young larvæ of *Callimorpha hera*, which he had just received from the French Alps, where the imagines absolutely swarmed. Mr. J. N. Smith, on behalf of Mr. Fitzgerald, a remarkably smoky variety of *Melanippe montanata*, one of a pair taken at the same time and place. Mr. Tolhurst, the curious telescopic larvæ of *Eristalis tenax* from a tank of foul water in his garden. Mr. West, of Greenwich, specimens of the Hemipteron *Atractotomus mali*, which he had taken on whitethorn at Lewisham. Mr. Ficklin, larvæ of *Dianthœcia nana* from the Land's End. Mr. South, two bred specimens of *Peronea permutana* from Eastbourne which differed very considerably from the Wallasey type. Mr. Adkin, a small brood of *Abraxas grossulariata* which exhibited none of the peculiarities of the female which deposited the ova.

August 26*th*.—The President in the chair. Mr. Tutt exhibited the egg of *Polyommatus corydon*, which had never been previously described, and remarked on its beautiful reticulated appearance; a living *Mantis* from Aix-les-Bains, which had fed ravenously on cockroaches; a *Tipula* with beautifully marked wings; and specimens of an Orthopteron which were abundant and active on the wing about 9 a.m. near Susa, and remarked on the protective coloration of the latter species. On behalf of Mr. Tuck, of Bury St. Edmunds, he also exhibited a nest of *Vespa rufa* which had been attacked by the larvæ of *Aphomia sociella*, and which was about a foot deep in a bank; part of the nest of *Bombus lapidarius* attacked by the same species, and which had been taken from a rat's hole in a pigstye; and further a nest of *Bombus latreillellus*, similarly attacked, taken from a mouse's hole in a pasture. They were all taken during the few previous days. Mr. Adkin, series of *Bryophila muralis* (*glandifera*) and *B. perla* from Poole, with series from Eastbourne for comparison. Mr. McArthur, specimens of *Larentia salicata* from North Devon, small and dark compared with those from other localities; a second brood specimen of *Smerinthus populi;* and a series of good varieties of *A. grossulariata* bred this year.

September 9*th*.—The President in the chair. Mr. Spindler exhibited a remarkable variety of *Epinephele tithonus*, in which the whole of the dark markings were absent, while the fulvous colour was of the normal tint. It was taken at Luggershall, Sussex. Mr. South, several unusually dark forms of *Spilosoma menthastri*, descendants of Moray parents, reared in London. Mr. Turner, an unusually grey specimen of *Mamestra abjecta* taken in the Greenwich marshes; a small red form of *Agrotis tritici* from Woolmer Forest, Hants; series of under sides of

*Enodia hyperanthus** from Carlisle and Chattenden to show the contrast in the ground colour, the former being of a grey appearance, while the latter were deep and rich; a larva of *Heterogenea limacodes* from Westerham; and larvæ of *Acidalia immorata* from Alpine ova. Referring to the latter, he remarked upon the undoubted *Acidalia*-like habits and appearance of the larvæ, and said that they fed readily upon knotgrass. Mr. West, of Greenwich, specimens of the local Hemipteron, *Dictyonota fuliginosa*, taken on broom at Plumstead. Mr. Adkin, series of *Satyrus semele*, from Eastbourne and Bournemouth, for comparison, with examples set to show their natural resting positions on the ground. Mr. Tutt remarked that allied continental species had precisely the same habits. Mr. Lucas, specimens and drawings of the scarce dragonfly *Agrion mercuriale*, which he had taken in the New Forest. Mr. Dennis, under the microscope, ova of both *Polyommatus corydon* and *Plebius ægon*, the former of which had not yet been described. Mr. Tutt, a cabinet drawer containing a long series of *Erebia nerine* and its near allies, together with photographs of the famous Mendelstrasse, in illustration of a paper, entitled, "A Gregarious Butterfly, *Erebia nerine*, a Reminiscence of the Mendelstrasse, with Notes on the Lepidoptera of the Serpents of the Mendelstrasse," which he read.—Hy. J. Turner, *Hon. Rep. Sec.*

Birmingham Entomological Society.—*August 16th*, 1897.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. Bradley showed *Æschna grandis* from Sutton, and said that it was quite unusually common there this year both in the park and in his garden; also *Molophilus murinus* from his garden, where he had taken a fair series this year, though it had not occurred there before. Mr. R. H. Martineau showed larvæ, pupæ, and imagines of *Authophora furcata*, to illustrate its life-history; also *Salius fuscus* from Wyre Forest, with a large spider it had captured; *Mimesa bicolor*, male and female, from Coleshill; and *Ammophila sabulosa* from Wyre Forest. He also said, *à propos* of a note by Mr. E. Saunders in the July number of the Ent. Mo. Mag. on "Muscular Energy in a *Tipula* Leg after Death," that he had watched a dissevered leg of a harvest bug (Acarinæ) move spasmodically round a plate for thirty-five minutes. He also stated that he once removed the body from a living wasp, and then supplied it with liquid food; it drank up the food until it had deposited a large bead of it behind. He then attached a cork body to it, and the insect flew across the room, though of course badly and not straight, as the balance could not be restored. Mr. J. W. Moore showed a little lot of Lepidoptera from the Fens, where he had collected them last Whitsuntide, which included *Senta maritima* with var. *wismariensis*, a fine series of *Leucania obsoleta*, a single *Tapinostola elymi*, *Acronycta leporina*, *Lithostege griseata*, &c.; also, from Scotland, *Arctia fuliginosa*, bred *Hadena pisi* which were small, dark, and more marbled than usual, an *Acronycta myricæ;* also a series of *Agrophila sulphuralis* from Tuddenham. Mr. G. T. Bethune-Baker exhibited two drawers from his collection containing the genus *Aporia*, and parts of the genera *Parnassius* and *Pieris*. He pointed out how naturally *Parnassius* runs into *Aporia* through *mnemosyne*, in which all the red and some of the markings have gone, and *stubbendorfii*, in which the dark colour is nearly confined to the nervures; also that *Aporia* runs into *Pieris* through *A. hippia* and *P. melete.*—Colbran J. Wainwright, *Hon. Sec.*

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* It is quite possible that *hyperanthus* is not strictly congeneric with *Epinephele ianira* and *E. tithonus*, but still it is probably more correct to keep it in that genus than to place it in *Enodia*. Scudder (Butt. New Engl. i. p. 176), in his remarks on *Enodia*, states that the genus "is confined to eastern North America, where it is represented by a single species," *i. e. E. portlandica*, Fab., = *andromacha*, Hübn., a very different looking insect to the European *E. hyperanthus*.—Ed.

RECENT LITERATURE.

Publications Issued by U. S. Department of Agriculture.—Entomology.

The Asparagus Beetles, by F. H. Chittenden.—The introduction and subsequent spreading of *Crioceris asparagi*, L., and *C. duodecempunctata*, L., in America are referred to. In addition to its natural checks, which appear to be numerous, various simple methods are discussed for keeping the commoner species, *C. asparagi*, under control; the other species does not seem to have done any great damage at present.

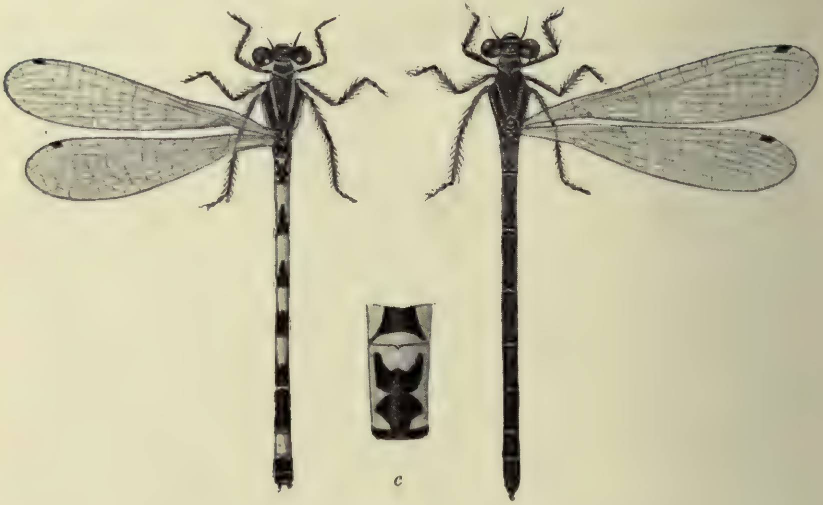
Some little-known Insects affecting Stored Vegetable Products: a collection of articles detailing certain original observations made upon insects of this class. By F. H. Chittenden.—Contains information concerning *Ephestia cahiritella*, Zell. = *passulella*, Barr., and *E. elutella*, both of which are said to feed on chocolate, either in its raw state or on the manufactured article. Other species of Lepidoptera and Coleoptera injurious to dried fruits, grain, flour, and various stored products are dealt with. There is also an article on the parasites of *Ephestia kühniella* and *Plodia interpunctella.*

The San Jose Scale and its Nearest Allies: a brief consideration of the characters which distinguish these closely related injurious scale insects. By T. D. A. Cockerell.

Insect Control in California. By C. L. Marlatt.

General Index to the Seven Volumes of Insect Life, 1888–1895. This elaborate compilation enables one to find what one requires in the volumes without trouble.

Obituary.—We regret to announce the death of the Rev. Andrew Matthews, rector of Gumley. He was born on June 18th, 1815; and died on September 14th last. In 1872 Mr. Matthews published the first volume of 'Trichopterygia illustrata et descripta,' with thirty-one plates drawn by himself; and in his eightieth year he completed a second volume, also illustrated by his own hand: this is now with the publisher. Among his other works are papers on the genera *Hydroscapha, Amblyopinus, Myllaena;* and synopses of the Trichopterygidæ of Europe and North America. He also described the species of his particular group of Coleoptera in 'Biologia Centrali Americana.' We understand that after the publication of the first volume of Trichopterygidæ he was offered the Fellowship of the Royal Society, but declined the honour.



a Fig. 1. *b*

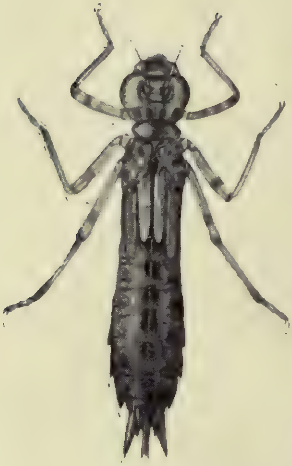
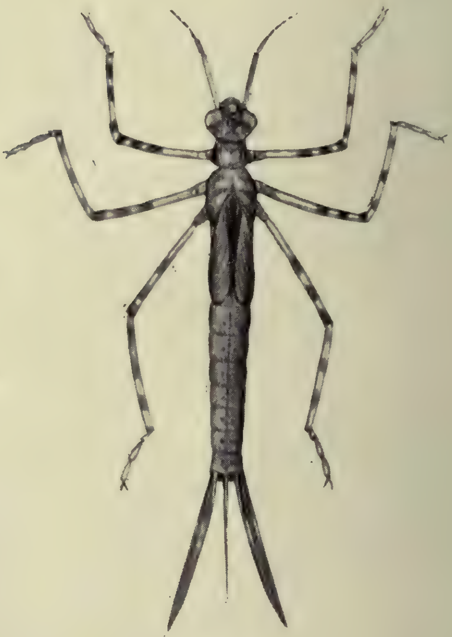


Fig. 2.



W. J. Lucas del.

Fig. 3.

Fig. 1.—*Agrion mercuriale.* *a*, male imago (twice natural size). *b*, female imago (twice natural size.) *c*, distinctive markings on first and second segments of abdomen (more highly magnified.)
Fig. 2.—*Anax formosus.* Full-grown nymph (nat. size.)
Fig. 3.—*Calopteryx splendens.* Full-grown nymph (twice nat. size.)

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DRAGONFLIES IN 1897.

By W. J. Lucas, B.A.

(Plate I.)

While lepidopterists have been complaining of the uselessness of sugaring and larvæ-hunting, and of the paucity of insects generally, the dragonfly collector has had his hands full, though perhaps the scarcer species have not crossed his path so frequently as he would wish. Owing, however, to the cold weather in the latter part of the spring, the season for the perfect insects was somewhat late in commencing, and my first capture of *Libellula quadrimaculata* did not take place till May 9th, whereas in 1894 I secured a specimen as early as April 25th; and though *Pyrrhosoma minium* was taken on May 2nd at the Black Pond, near Esher, it did not become general there till after the middle of the month.

During the season I have been able to sketch and describe the eggs of about a quarter of the British species of Dragonflies, and although perhaps the material thus obtained is scarcely sufficient to allow one to make many general statements, yet the following remarks will probably need but little subsequent modification. In colour the eggs are very pale yellowish white, which in some cases turns to reddish brown after they have been for a time in the water. They are semitransparent, and closely resemble ovules or very young seeds of a plant, their contents being granular, as if protoplasmic, and perhaps containing globules of an oily nature. They all, or nearly all, still further resemble ovules in possessing a little pedicel at one end. In shape there is some variation. The Libelluline, Corduliine probably, and Corduligasterine families have eggs whose section is elliptical, oval, or pear-shaped, the two axes not differing greatly in length, the major being in *Platetrum depressum* about three-quarters of a millimetre. With the Æschnines, however, the egg is much longer than broad, being, in fact, a cylinder with rounded ends—in *Anax formosus* nearly 2 mm. long and one-third of a millimetre broad. I have not seen any Calopterygine eggs, but those of two Agrionines—*Agrion cyathigerum* and *Pyrrhosoma tenellum*—were very similar to one another, and closely resembled those of the Æschnines, being of course smaller, though large for the insect; they were not quite cylindrical, but the transverse axis increased a little in length towards the end bearing the pedicel. It would seem that the broad-bodied group and their relatives have broad eggs, while the decidedly long-bodied groups have elongated ones. A dragonfly like *Anax formosus* must produce a tremendous number of eggs, for when about to lay the body of the female contains little else than ova. No doubt this is an advantageous provision of nature, for the very young nymphs, and possibly the eggs also, must find many enemies in their watery home. In the case of several species I have noticed that the female drops the eggs at random into the water, often being accompanied by the male, which, with its anal appendages, clasps her by the thorax, apparently with the object of supporting her on the wing while she is ovipositing.

As regards larva-nymphs, by various means I was able to identify several during the season. From the Black Pond was obtained a nymph, which I suspected to be *Cordulia ænea*, but about which I could not feel quite certain, as it at first sight closely resembled the nymph of *Libellula quadrimaculata*. The discovery of one or two skins, that clearly belonged to the same species, in close proximity to newly-emerged imagines of *C. ænea*, made me confident that I was right in my surmise, and the breeding of a specimen on May 21st from a nymph obtained near Byfleet enabled me to identify the species with certainty. It may be distinguished from *L. quadrimaculata* and *Platetrum depressum*, both of which broad-bodied nymphs it closely resembles in general shape, by the greater length and slenderness of the legs, by the pale lateral markings on the abdomen, and by the shape of the ninth and tenth segments, which end abruptly and do not taper off gradually to the anal appendages. On May 16th, at the Black Pond, I found a *C. ænea* so lately emerged that its wings were not inflated, transfixed through the head by a spike of dry grass. The insect was alive, and the accident had probably been caused by the wind, for the same day I took a living female floating on the water.

Although I bred *P. depressum* on June 14th, and had during a previous season bred *L. quadrimaculata*, I am afraid I could not undertake from their general appearance to distinguish between the nymphs. The former appears to have stouter legs, with which it burrows easily in the mud, and it should, I think, be sought there; *L. quadrimaculata*, I believe it may be safely asserted, will always be found amongst weeds.

A male *Agrion pulchellum* put in an appearance on May 22nd, but I was not expecting to breed the species, and the nymph-case after the emergence was so collapsed that little could be made of it.

On June 7th, near Wisley in Surrey, I found a number of nymph-cases of *Calopteryx splendens*. This nymph cannot possibly be confused with any other except its congener, *C. virgo*, which, however, it certainly does very closely resemble. But as I have never met with *C. virgo* anywhere in the neighbourhood, while *C. splendens* is remarkably common, its identification was a matter of certainty. It possesses three caudal lamellæ, as do the Agrionines, but the outer ones are three-edged instead of flat, and the nymph itself is very much larger than any of that family. Besides this the triangular head and extremely long basal joint of the antennæ are also conspicuous points for distinguishing it from anything except *C. virgo*. Of those found on June 7th, some were on reeds and others on wooden walls. In the latter case they must have crossed a canal-path and then climbed several feet up the wall before disclosing the imago. All were a good deal incrusted with mud. This insect, which is of a general brownish colour, is shown in the Plate (fig. 3), twice natural size. Singularly enough, I received from Mr. Bell-Marley, on Aug. 3rd, a nymph (apparently of *Æschna cyanea*), which, he says, must have crawled ten yards or more out of the water, and then mounted a high railing before the imago emerged. He noticed the absence of pond-reeds, and this probably was the cause of the expedition.

Collecting at the Black Pond on June 17th, I came across an empty nymph of *Anax formosus*, whereupon a young friend, W. Prest, who was with me, searched carefully, and found a fair number of nearly perfect cases at the bases of the clumps of rushes: others he obtained in the same manner on the 21st. In this instance, though no imagines were found near the empty cases, there could have been no doubt as to the identification, even if the nymph had been unknown to me, for no other dragonfly at all commensurate with *A. formosus* was then on the wing at the Pond. It is represented of the natural size at fig. 2 in the Plate, and may be described as follows:—In length it is 54 mm., and in breadth 10 mm. The colouring of the empty case is a pale yellowish brown; along the back is a much darker stripe, which is almost obliterated on the posterior part of each segment, and is traversed down the centre by a pale streak. Most of the abdominal segments have eight small dark depressions, and the sides of the abdomen, as well as the thorax, are relieved by a number of pale streaks. The head is flat, while the eyes are large and rounded, and separated by almost a straight line from the occiput, the posterior margin of which is also almost straight. The two thoracic spiracles are uncovered and conspicuous. The mask is rather slender and of good length; it broadens somewhat anteriorly, and the inner hook is cut square, while the outer moveable one is long and sharp. Of the leg-base processes, the hinder one is largest, and a right angle is enclosed between them. The legs, which are fairly stout, are marked with several rather dark rings. In front the abdomen is slightly contracted, but it expands posteriorly, and then contracts again. Segments 7, 8, and 9 have long lateral spines, that on the ninth being almost as long as the tenth segment. The lower abdominal appendages are long and sharp, the middle one is rather shorter and notched at the extremity, while the superior laterals are not half as long as the lower ones. The male projection on the under surface of segment 9 is very small, but that of the female is about two-thirds the length of the segment.

On July 18th, when *Sympetrum scoticum* was just emerging at the Black Pond, I succeeded in securing a few nymph-cases by looking for the very recently-emerged imagines, and then searching for the nymph-skin on the rushes or reeds below it. Except as a result of breeding, this is usually the most satisfactory method of obtaining nymph-cases whose identity is undoubted; in the case of the Agrionines, however, the skins are usually so ethereal that they are of little use. *S. scoticum* is rather elegant in form, and closely resembles a miniature *C. ænea*, and might be mistaken for that nymph, only that *C. ænea* of the same size would be almost or quite innocent of wing-cases.

Some nymphs of *Sympetrum striolatum*, which, as mentioned earlier in this volume (p. 30), hatched out about Oct. 18th, 1896, are at present, I am afraid, represented by a single specimen, but that is now (Oct. 1st) about 16 mm. in length, and certainly will not take two more seasons to reach its full size. It will, I should say, if still living, produce an imago next July, and that although it has not had a plentiful supply of food. It would almost seem that a well-fed nymph might become mature the season following the laying of the egg, instead of taking three years as is sometimes supposed; but it is just possible that out of doors the eggs may not hatch till the following spring.

Turning now to the perfect insects. The first on the list, *Platetrum depressum*, was met with on two occasions only—at Longcross, near Chertsey, on June 6th, when I noticed a female ovipositing by dipping her abdomen in the water, apparently quite at random, and at the Black Pond on June 13th. *Libellula quadrimaculata* did not appear to be quite so common as usual. I found it between May 9th and July 25th at the Black Pond, the Basingstoke Canal near Byfleet, and Wisley Pond. In the

New Forest, almost wherever I went between Aug. 1st and 14th, *Orthetrum cærulescens* was very common. The other species of the genus, *O. cancellatum*, I met with at Wisley Pond on June 22nd, when it was rather fresh upon the wing. *Sympetrum striolatum* was another very common species in the New Forest at the beginning of August, and I often noticed them in pairs, the females ovipositing by dipping their abdomen into the water, as in the case of *P. depressum*, and apparently quite as aimlessly. This species was also seen or taken in several spots around Oxford towards the end of August. It was common at Wisley and Black Ponds in Surrey in September, and several specimens were observed at the last locality as late as Oct. 17th. *Sympetrum scoticum* was first noticed at the Black Pond on July 18th, and was then in good numbers. It was still on the wing in considerable plenty at the same place on Oct. 17th. I noticed a few at Wisley Pond on Aug. 16th, and a pair on Sept. 11th. In the New Forest I came across a few on Aug. 10th, in a boggy spot about a couple of miles from Brockenhurst; but there apparently are not many in the Forest, at any rate in the southern part. One or two specimens of this species had a tendency to saffron suffusion of the fore wings, not an uncommon form of variation amongst the Libelluline dragonflies.

Cordulia ænea was met with on several occasions—at the Black Pond on May 16th, May 23rd, and June 13th; over the canal, near Byfleet, on June 7th; and at Wisley Pond on June 23rd.

Between Aug. 1st and 14th *Cordulegaster annulatus* was very common in the New Forest, generally flying low along the streams. Large numbers of males might have been taken, but I noticed only one female, which was captured as she was ovipositing.

In Surrey, *Anax formosus*, though certainly very difficult to capture, is not so uncommon an insect as is often supposed, and it cannot be confused with any other dragonfly, for there are none on the wing during its time of flight that it at all resembles. Good numbers were out at the Black Pond on June 13th, and several were about still on July 25th. On July 18th I took a female there which had a blue abdomen, somewhat like the one figured by Charpentier;* but all other females I have taken have been quite green. On July 25th I caught a male which I had just observed catch a *S. scoticum*. This it let go in the net. I then, while holding *formosus* by the wings, offered it another *scoticum*, which it seized and held with its legs (not its jaw). After being bitten *scoticum* was let fall. I again offered the *scoticum*, which (except the wings and part of the abdomen) was devoured with gusto. I also saw this species at Wisley Pond on

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* 'Libellulinæ europææ,' pl. 45, fig. 1.

June 22nd and 23rd, and took a male on Bookham Common on July 3rd. *Brachytron pratense* was noticed on June 7th at the canal near Byfleet, and on June 23rd at Wisley Pond.

Though a good many Æschnas were seen, I took but two during the season, an early female *Æ. cyanea* near Esher on July 25th, and a female *Æ. mixta* at Wisley Pond on Sept. 11th. On the latter date I had been watching for some time, in one corner of the large pond, a small *Æschna*, which I took to be *mixta*, especially as it flew rather high, a habit which rightly or wrongly I have associated with this insect. Other Æschnas went up to it, but left it alone. Presently it went away towards the smaller pond. Later I went there, and saw the same insect, or another somewhat like it, flying about some bushes. After a time it settled, whereupon I secured it, and sure enough it was a splendid female *mixta*, a new record for Wisley, and my second capture of the species, my first of the female. Strangely enough, a day or two later Mr. M. Burr sent me a male of the same species, which he had knocked down at East Grinstead on Sept. 12th with a tennis-racket—an ignominious method of capture, considering the patient watching that is usually required before securing an insect belonging to the genus *Æschna*. The last *Æschna* seen though I could not identify it, was on Oct. 10th at Esher.

Calopteryx virgo was still fairly common in many places in the New Forest, between Aug. 1st and 14th, though its real season was over. *C. splendens* swarmed in many places in Surrey. I took it between June 7th and July 11th, principally along the canals and rivers; only stragglers were taken at the Black Pond and Wisley Pond. On Aug. 19th one female was taken on the bank of the Thames—in Berks, at Eynsham, a few miles from Oxford.

Lestes sponsa was taken over a tiny, almost dried-up pond near Brockenhurst on Aug. 13th, at Wisley Pond on Aug. 16th and Sept. 11th, and two were captured on a cool windy day (Sept. 4th) on Winchelsea marshes.

But six *Platycnemis pennipes* were taken near Newark Abbey, in Surrey, on July 11th, but the species was very common in some places in the New Forest in the beginning of August, and I found a few by the Thames side in Berks, near Eynsham, on Aug. 19th.

Between June 7th and Aug. 19th, *Ischnura elegans* was noticed in several localities: Canal at Byfleet; near Newark Abbey, Surrey; in the New Forest; at Wisley Pond; and in Berks, near Eynsham.

Agrion puella was not noticed till May 23rd, but it had a long period, for the last to be noted occurred on Aug. 16th. Localities were the Black Pond, not very common; Longcross, Surrey;

canal, near Byfleet; Wisley Pond; Bookham Common; near Newark Abbey; near Brockenhurst. *A. cyathigerum* was on the wing still longer than *A. puella*, for the first was seen on May 16th, and the last on Sept. 26th, the localities being Black Pond, very common; canal, near Byfleet; Bookham Common; New Forest. Charpentier* figures the female blue; but, though I have taken several blue females, most are greenish in ground colour. The spot on the second segment of the male, which is usually elliptical, has not seldom a point anteriorly, and in one case was reduced to a thin transverse streak detached from the circlet as the spot often is when normal in shape. *A. pulchellum* was fairly common in one restricted spot by the side of the canal, near Byfleet, on June 7th and July 11th. On Aug. 3rd I found *A. mercuriale* fairly common along one of the streams in the New Forest. In several cases they were flying in pairs, but the majority were males. A few days later I saw no females at all. On the wing this insect closely resembles *A. puella*, *A. cyathigerum*, or *A. pulchellum*, but it is decidedly smaller (see Plate, fig. 1). The males of this species may be at once recognised by the very distinctive mark on the second segment, an enlarged drawing of which is shown in the figure. The females are dark, like those of *A. puella* or *A. cyathigerum*.

Between May 2nd and Aug. 5th, *Pyrrhosoma minium* was met with in a number of localities—Black Pond; Longcross, near Chertsey; canal, near Byfleet; near Newark Abbey; and one or two places in the New Forest. Specimens with a bunch of acari attached to the under surface of the thorax were taken at Longcross. *P. tenellum* was as usual later than its congener. It was on the wing from June 13th till Sept. 11th, and was noticed at the Black Pond in large numbers, and in a few localities in the New Forest.

Erythromma najas, a very local dragonfly, swarmed in a somewhat restricted locality at the canal, near Byfleet, on June 7th. Some were taken at Wisley Pond on June 23rd, and, strange to say, a single specimen, a male, was taken at rest on the evening of June 17th at the Black Pond, this making yet another new record for that prolific locality.

21, Knight's Park, Oct. 19th, 1897.

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* 'Libellulinæ europææ,' pl. 42, fig. 1.

CHORTODES MORRISII, Dale MSS., Morris = *C. BONDII*, Knaggs.

By J. W. Tutt, F.E.S.

I am sorry to disagree with so eminent a lepidopterist as Dr. Knaggs, but as I long ago came independently to precisely the same conclusion as Mr. Meyrick as to *bondii*, Knaggs, being simply a synonym of *morrisii*, Morris (or Dale), and as I have had reason occasionally to adversely criticise some of Mr. Meyrick's work, I think it only just to say plainly that I agree with him absolutely on this point, and disagree just as absolutely with Dr. Knaggs.

So far as this is a matter of fact and not of sentiment, I would ask any lepidopterist interested in the subject to compare carefully Humphrey and Westwood's figure, which Dr. Knaggs dismisses as "an insect with narrow pointed wings, purporting to represent *morrisii*," with a good series of the Folkestone insect, and say whether they are not identical, and again, if they think not, I would ask what other British insect the figure represents?

The fact that the Rev. F. O. Morris, in 1872, forgot something that he had done in 1837, thirty-five years before, is not wonderful. To say the least, Mr. Morris was not a deeply scientific entomologist. Besides, to what other *Acosmetia* (in the old sense) are the opening words of his own description, "Pale straw-colour approaching to silvery white," &c., applicable? There were many things entomological, if we take Morris's book as a standard, of which that author was apparently unaware. In fact, he seems to have been much more "unaware" than he was "aware" of some of the subjects of which he treated, but that does not alter the fact that Charmouth, where the original *morrisii* were captured, is, next to Folkestone, the best known locality for *bondii*. I do not wish to quibble about Charmouth and Lyme Regis and their respective positions. I take the report of Mr. Goss as to its distribution as the important factor in this direction, and most working lepidopterists know that the Lyme Regis locality has long since been found to extend almost to Charmouth.

There are many important things relating to the enquiries that have been made into the synonymy of this species of which Dr. Knaggs does not seem to be aware. Some six years ago I thoroughly sifted the matter, and wrote as follows ('British Noctuæ and their Varieties,' vol. iv. p. 97):—"This (*morrisii*) certainly is not a pale variety of *arcuosa*. The original description and notes relating to *morrisii*, copied from Humphrey and Westwood, are as follows: '*Acosmetia morrisii*, Dale ('Naturalist,' ii. p. 88, and Errata): This species measures about an inch in the expanse of the fore wings, which, as well as the hind wings and body, are entirely of a pale whitish colour; the costa of the fore wings slightly brownish, &c. Named by Mr. Dale after the Rev. F. O. Morris, who discovered it. It has been taken several times on the East Sea Cliff, Charmouth, Dorset, at the beginning of July. We are indebted to Beverley R. Morris, Esq., for the loan of two specimens differing somewhat in size' ('British Moths,' p. 243, pl. liv. fig. 12). The probability of this being identical with *bondii*, on an examination of Humphrey and Westwood's figure, the hind wings of which are strikingly those of *bondii*, was immediately strengthened by the knowledge that Mr. Tugwell had previously recorded *bondii* from Lyme Regis, a few miles from Charmouth, where the typical specimens of *morrisii* were captured by Mr. Morris. I wrote to Mr. Tugwell, asking him about the probability of *bondii* occurring at Charmouth, and he wrote: 'The locality for *bondii* at Lyme Regis is, I believe, about ten miles as the crow flies from Charmouth; but from what I saw of the coast-line, I should judge that *bondii* might occur in many places between the two towns. I only worked the Devonshire side of Lyme Regis, but found it in plenty there' (*in litt.* 18/7/92). This, therefore, helps to support my determination of Humphrey and Westwood's figure, and *morrisii* will have to be struck out as a variety of *arcuosa* and added as a synonym of *bondii*, which name, indeed, it will replace if *extrema* be not generally accepted for this species, as *morrisii* is much anterior to *bondii*. There can be no doubt that Humphrey and Westwood's figure is made from indubitable *morrisii*, for the specimens were sent by Mr. Beverley Morris from the collection of the Rev. F. O. Morris, the original captor. It has always appeared strange to me that so common a species as *bondii* has since proved itself to be in its favoured localities should have been quite unknown to our older collectors who met with many of our rarer species.

"With regard to the occurrence of *bondii* in the neighbourhood where the original *morrisii* came from, Mr. Goss writes: 'Although probably most lepidopterists are aware that *T. bondii* is to be found in the neighbourhood of Lyme Regis, I do not think the occurrence of this species in Devonshire has been noticed in this magazine. As the species is so extremely local, not only in this country but on the Continent of Europe, it may be as well to record the fact of my finding it in abundance, in the beginning of July last, on the rough broken ground forming the slopes of the cliff immediately to the west of the cement-works at Lyme Regis, well into Devonshire. It may be worth noting that of the two localities in this country from which this species has yet been obtained, one is in the south-east of Devon, and the other in the south-east of Kent' (Ent. Mo. Mag. xvii. p. 134); whilst the editors of the Ent. Mo. Mag. note at the same time that the species was first discovered at Lyme Regis by Mr. Percy Wormald, and noticed in 'The Zoologist,' vol. xxi. p. 8861."

As the foregoing extract was published in 1892, and Mr. Meyrick's 'Handbook' in 1895, it would have been well if Dr. Knaggs, in correcting "some inaccuracies" made by Mr. Meyrick, had set forth logically both sides of the question, when he might have discovered that others who had studied the question *de novo* were in perfect accord with Mr. Meyrick.

I am rather inclined to think with Dr. Knaggs that the species will have to be in future written *Chortodes morrisii*, Morris, and not *Chortodes morrisii*, Dale.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 238.)

Eupithecia satyrata, *Hb.*—Is found commonly on all the bogs and moors of Ireland. It varies greatly, the whitish grey variety having been met with at Derry (*C.*); Churchill, Co. Armagh (*J.*); near Favour Royal, Tyrone; Moycullen, Connemara; Markree Castle, Sligo, and Knocknarea (*Russ*). A striking form with well-marked striæ, but perhaps not so strongly banded as most examples of the var. *curzoni*, occurs at Powerscourt, Co. Wicklow; and on the Belfast hills Mr. Watts met with similar specimens. The var. *subatrata* also occurs abundantly near Galway (*A.*), and Moycullen; at Mohill, Co. Leitrim; Favour Royal, Tyrone; and elsewhere.

Eupithecia castigata, *Hb.*—One of the commonest species of this genus throughout Ireland, and most variable in markings and tint. Large examples with strongly marked strigæ are often difficult to distinguish from *E. lariciata.*

Eupithecia jasioneata, *Crewe.*—This interesting species appears to be confined to the south-west corner of Ireland, not having so far been captured out of Kerry and the portion of Cork which includes Bantry Bay. In those districts, however, it is found abundantly both along the shores of Dingle and Bantry Bay, and inland from Kenmare, as well as about Killarney; in fact, generally wherever *Jasione montana* is plentiful. The first Irish specimens were brought as pupæ by certain collectors of Mr. Meek, who, taking them to belong to some common species, threw them out on a dust-heap in his yard. In due time many of them emerged, and proved to be the scarce *Eupithecia* named by Mr. Crewe from Cornish specimens. They are to be taken in flight at dusk where plentiful, but are more easily captured as larvæ on their food-plant. They vary somewhat, and often are handsomely marked with pale strigæ outside the central spot and the elbowed line.

EUPITHECIA TRISIGNARIA, *H. S.*—Howth (*B.*) I have not met with it in Ireland.

EUPITHECIA VIRGAUREATA, *Dbl.* — Howth, Powerscourt, Co. Wicklow, and Killarney (*B.*); Knocknarea, rare (*Russ*), and Markree Castle, Co. Sligo; Armagh (*J.*); Clonbrock, Co. Galway (*R. E. D.*); Glendalough, Co. Wicklow. Mr. Campbell recorded this species from near Derry, as I understand, in error.

EUPITHECIA FRAXINATA, *Crewe.*—Very rare, Killarney; Clonbrock (*R. E. D.*) and Ardrahan, Co. Galway; Markree Castle, Co. Sligo.

EUPITHECIA PIMPINELLATA, *Hb.*—Howth (*B.*). At a quarry by Dean Rock on the Lough road, Cork (*Holt*); near Derry (*C.*); and probably Birchall's record of *denotata*, Killarney (*Wallace*) refers to this species.

EUPITHECIA VALERIANATA, *Hb.*—I have met with the larvæ in Lord Farnham's demesne, Cavan. Imagines taken at Moycullen, Co. Galway, were identified by Mr. Barrett as probably of this species.

[EUPITHECIA INNOTATA, *Hufn.*—Birchall's Wicklow record must be deleted. There is a reference in the Ent. Mo. Mag. vol. ii. 261, to a capture of this species in the "North of Ireland."]

EUPITHECIA INDIGATA, *Hb.*—This species has probably been overlooked, and will be found more widely distributed than my localities suggest. The tracts of country in Donegal, Galway, Leitrim, and Mayo, where wild juniper grows freely, still await careful exploration by entomologists. Altadiawan, Co. Tyrone (*M. F.*); Clonbrock (*R. E. D.*) and Galway (*A.*); Derry (*C.*); and some very black specimens taken near Belfast by Mr. Watts are questionably referable to this species, but probably to *assimilata* (*G. C. B.*).

EUPITHECIA CONSTRICTATA, *Gn.*—Mr. Barrett's statement that this insect was generally distributed and common, and that he had taken it in considerable numbers at Howth, Galway, and Killarney, has been corroborated by its subsequent capture in many localities since. Howth (*G. V. H.*), Glendalough, Co. Wicklow; Favour Royal, Tyrone; Armagh (*J.*); Castle Bellingham (*Thornhill*); Island Magee and Kilkeel, Co. Down (*W.*); Knocknarea (*Russ*) and Markree Castle, Co. Sligo; Drumaweir, Inishowen (*G. V. H.*), and Derry (*C.*); Kilcornan, Co. Galway. Staudinger gives no continental localities for this insect.

EUPITHECIA NANATA, *Hb.*— Universally distributed and common on all the bogs and mountain tracts of Ireland. The whitish strigæ are sometimes not very conspicuous, but I have seen no specimens approaching var. *obscurata*, Stgr., in which they are almost obsolete.

Eupithecia subnotata, *Hb.*—Mr. Birchall met with it in some numbers. I have taken it on the Dublin coast, at Howth, Lambay Island, and Skerries.

Eupithecia vulgata, *Haw.*—Everywhere common. Variable in colour and strength of markings. I have seen nothing like the Hebridean form.

Eupithecia albipunctata, *Haw.*—Larvæ taken at Queenstown, Co. Cork, by Harper-Crewe. Knocknarea (*Russ*).

Eupithecia expallidata, *Gn.*—Wicklow (*Bw.*); Howth and Skerries, Co. Dublin; Castle Bellingham, several (*Thornhill*); Killynon, Westmeath, one; Magilligan, Co. Derry (*Curzon*). Great difficulty exists in identifying this species unless it is fresh, and some doubt having been expressed as to the captures of myself and Mr. Thornhill at Castle Bellingham, I have carefully compared the series with bred specimens from the collections of the late F. Bond and the Rev. Joseph Greene.

Eupithecia absinthiata, *Clerck.*—Generally common.

Eupithecia minutata, *Gn.*—Rather common in most places.

Eupithecia assimilata, *Dbl.*—Dublin (*B.*); Roches Point, Co. Cork; Markree Castle, Co. Sligo; Clonbrock, Co. Galway; Favour Royal, Tyrone.

Eupithecia tenuiata, *Hb.*—Widely spread, and often not uncommon. Killarney (*B.*); common in Co. Wicklow, at Arklow, Glenmalure, and Wooden Bridge (*G. V. H.*); Knockdrin, near Mullingar; Markree Castle, and Knocknarea (*Russ*), Co. Sligo; Derry (*W. E. H.*); Castle Bellingham, abundant, Co. Louth (*Thornhill*); Armagh, and Belleek, Co. Fermanagh (*J.*).

Eupithecia lariciata, *Frr.*—When I first added this species to the Irish list, I had little idea that it would subsequently prove so widely spread as subsequent observation has indicated. It would seem extremely improbable that Birchall could have overlooked it if it existed in his time with the same distribution and numerical proportions. His last supplement to the 'Catalogue' was published many years after its discovery in England. I am therefore of opinion that this moth is a recent introduction to our fauna, consequent on the extension of planting operations, especially of larch, since his time. The imago varies a good deal in size and marking, some specimens being small and obscurely marked, and approaching *E. castigata* in general appearance. Knockross, on the shore of L. Derrevaragh, Co. Westmeath, numerous; Altadiawan, Co. Tyrone, numerous;

Knocknarea (*Russ*) and Markree Castle, Co. Sligo; near Donegal; Drumreaske, Monaghan; Castle Bellingham, Louth (*Thornhill*); Glendalough, Co. Wicklow; Howth (*G. V. H.*); Cratloe, near Limerick; Ardrahan, and near Galway (*A.*).

Eupithecia abbreviata, *St.*—Widely spread and common in many localities in Wicklow, Kerry, Galway, &c. I have not met with it numerously in the North of Ireland. The following are a few localities where it is more or less numerous:—Killarney; Powerscourt, Arklow, and Wooden Bridge, Wicklow; Clonbrock, very abundant, Co. Galway; Markree Castle, &c., Sligo; Derry (*C.*); Ballycastle, Co. Antrim (*Curzon*); Favour Royal, Tyrone; Drumreaske, Monaghan; Belleisle, on L. Erne, &c.

Eupithecia dodoneata, *Gn.*—Has occurred in several widely separated districts in the centre and north of Ireland. Powerscourt and Glendalough, Co. Wicklow; Armagh (*J.*); near Galway, fairly abundant (*A.*); Knocknarea (*Russ*), (Ent. Record, vol. vii.).

Eupithecia exiguata, *Hb.*—Not scarce, and widely spread. Common at Powerscourt and other parts of Wicklow; Dublin (*B.*); Killynon, Co. Westmeath (*Miss R.*); Drumreaske, Monaghan, abundant; Favour Royal, Tyrone; Kenmare and Killarney, numerous; Sligo (*Russ*); Clonbrock and Merlin Park, Galway.

Eupithecia sobrinata, *Hb.*—A good series was beaten from juniper at Tudor Cottage, near Kingstown, by the Rev. Joseph Greene many years ago. The Rev. W. F. Johnson has taken it at Armagh similarly. These no doubt are introduced specimens from nursery gardens. On the indigenous plants, however, it has also occurred at Knocknarea, near Sligo (*Russ*); and Mr. Barrett met with it in the Co. Antrim, and Mr. Watts at Slieve Donard, Co. Down.

Eupithecia togata, *Hb.*—This pine-feeder appears to be spreading over an extensive area in Ireland as a result of the planting of spruce-fir, and must be considered an introduced species. I first met with it at Knockdrin, near Mullingar, where Miss Reynell captured the first specimen, and it proved to be fairly numerous, as well as at Rockview, where I took the larvæ abundantly. Agher, Co. Meath (*Miss R.*); Killarney, one (*W.*); Sligo, one (*M'C.*); Clonbrock, Co. Galway, abundant, by Mr. Dillon and myself; and at Coolarne in the same county (*A.*). At Mote Park, Roscommon, and at Charleville Forest, Tullamore, Kings Co., and Drumreaske, I found traces of the larvæ. The Irish specimens I have seen appear to belong to the true type, being handsomely marbled with red; while the Scottish grey form appears more like the species *abietaria*, Göze (as was pointed out to me by Mr. Tutt', whose larvæ feed similarly on fir-cones.

Eupithecia pumilata, *Hb.*—Everywhere numerous in both emergences.

Eupithecia coronata, *Hb.*—Widely spread, but not apparently to be taken in numbers. Dublin, and Wicklow (*B.*); Drumreaske, Monaghan; Favour Royal, Tyrone; near Derry (*C.*); shores of L. Gill, Sligo; near Kenmare, and at Killarney; Crookhaven and Glengarriff, Co. Cork.

Eupithecia rectangulata, *L.*—I have met with no remarkable forms in Ireland. It is numerous in many localities. Drumreaske, Monaghan; Armagh (*J.*); Ballygawley, Tyrone; Tempo Manor, Enniskillen (*Langham*); Castle Bellingham, Louth (*Thornhill*); Derry (*W. E. H.*); Rockwood, Sligo; Killarney; Clonbrock (*R. E. D.*); Galway, &c.

Eupithecia debiliata, *Hb.*—Locally abundant in a few places. Torc Wood, Killarney; Markree and Rockwood, near Sligo; Glendalough, Co. Wicklow; Dromana, Co. Waterford; Clonbrock, Co. Galway, one (*R. E. D.*).

(To be continued.)

RE-APPEARANCE OF *DEILEPHILA GALII* ON THE LANCASHIRE AND CHESHIRE COAST.

By the Rev. A. Miles Moss.

Deilephila galii has been in the district again and we have all but missed it! If you tell your friends you are going to search for *D. galii* they laugh at you, and suggest that you might as well go out to look for gold watches! And this is the way we lose the prize.

No one will deny that the genuine, hard-working, field entomologist is a true sample of that dogged persistency of which we English, as a nation, are proud. He has made up his mind that he is not going to be beaten, and that no pains shall be spared when there is any reasonable chance of success.

But in a case like the present he is not always on the alert, and is sometimes apt to be behind the times. I know it has been so with me this year, or I should have been able to furnish the pages of the 'Entomologist' with a glowing record.

But to proceed. On Sunday, Sept. 12th, Mr. Prince, an entomological friend, told me that *D. galii* had turned up somewhere on the Welsh coast, and he suggested the possibility of it also occurring at Wallasey. So, determined to give the place a thorough search on the first opportunity, I took train out to Wallasey on the following Tuesday, Sept. 14th. My friend would have joined me in the expedition had he been free, but he was unfortunately detained by work.

On approaching the Wallasey golf-house I met a boy with a butterfly net, so I made his acquaintance, and asked him what he had found. He had not been searching the bedstraw, and had only got larvæ of *Bombyx rubi;* however, a man working on the greens had shown him a curious hawk-caterpillar, which he described as being like *Chœrocampa elpenor*, but with eyes all along the body. I guessed at once what it was, and thanked the lad for his information, telling him that in all probability it was the very creature I was in quest of. My first hunt therefore was to find this green-keeper, which I soon succeeded in doing, and there, sure enough, in the bottom of a tin was poor *galii*, trying to turn without any sand. The man very generously gave it to me, refusing to hear of any remuneration. I might mention here that it turned to a pupa the same evening on my return home, and is, I fear, slightly deformed through its rough handling. He had found it when half-grown, on a grassy meadow on the golf-course, and had kept it for a fortnight. It may seem an odd roundabout way of picking up knowledge, but this is where the motto of our excellent monthly journal comes in—"By mutual confidence and mutual aid great deeds are done and great discoveries made." To this spot I proceeded, but it did not look a likely place, as there was but little sand, and what bedstraw there was was growing amongst thick short grass. I could find no trace of any larvæ here, so I took a straight course of four or five hundred yards to the sandhills bordering the shore, where I soon discovered a mound with bedstraw growing sparsely all over the sand, and an occasional thicker patch.

It looked an ideal place, and so it would have been for me had I been there a week earlier. Not one or two, but numbers of *galii* had been feeding there, for the sand in many places was literally strewn with large pellets of frass, some still quite fresh, but I was too late. The nature of the place was such that I could not have missed them, had they been there as caterpillars, and an hour's diligent search only produced the shrivelled but unmistakable skin of one that had succumbed. In two other spots along the coast I found frass, but not in the same quantity, and was again only doomed to disappointment, finding two more dead. I could not leave without trying every expedient, so, borrowing a spade from a house on the links, I returned to the spot where the larvæ had been plentiful. I took my coat off and set to work with a will; but though I dug deep and shallow, and ere and there and everywhere, it was all to no purpose.

I feel confident that *galii*, like many other larvæ, sometimes wanders some distance before turning, and with no apparent reason, except it be natural instinct of self-preservation, or some provision of nature whereby the creature, by being kept in motion, is the better able to get rid of all digested food, and thus become prepared for the pupal stage. We know not: it is merely my own idea and it may be wrong, though I can produce arguments to support it.

Even now, as I write, I have three or four larvæ of *Macroglossa stellatarum* that have turned colour, and have for two days been wandering round their box from end to end, apparently undecided as to where to pupate. I might mention that these larvæ, varying from infancy to old age, have just been found at West Kirby, on Sept. 18th, but no signs of *D. galii* were to be found there.

But I must get on. This day, which had stirred my hopes and expectations to their very zenith, ended in failure and disappointment, and I went home feeling very angry with myself for not having been "more on the spot," in every sense of the term, a week earlier. I ought to add that on Aug. 17th I searched carefully over much of the same ground for *Chœrocampa porcellus* and *M. stellatarum* with much the same result. I was a week too late. The frass of both these larvæ, more especially *M. stellatarum*, was there, but they appeared to have been all of one batch, and every larva had gone down. Not a trace of any small *galii* larvæ did I see, showing clearly that the period from ova to full-grown larva must occupy less than four weeks.

The golfer after a bad day's sport goes home and vows he will never touch a club again, but invariably the next sunny morning sees him issuing forth to the fray again, recruited in strength and prepared to face and overcome any difficulty. In fact, some unknown quantity within him seems to whisper, "You can and will succeed if you stick to it and try again." It was with sentiments of a similar nature that the morning of Sept. 18th found me training out to Waterloo to make trial of the bedstraw there. A brief two hours' search was all that I could afford; however it was enough. The spot which I visited has been known to me since 1884, and, though in the midst of houses and infested by hens, the bedstraw grows well, and has generally been productive of *C. porcellus* and *M. stellatarum* (when present in the district at all). The first patch near the road showed me that *D. galii* had also visited the Lancashire coast this year, for there was the frass, and there, sad to say, was a dead caterpillar. The head and first two segments were quite fresh and still brightly coloured, but to all appearance a hen had been sampling the latter portion. Nearer to the sea I again found frass, but was once more disappointed as the caterpillar had gone, probably having buried on the previous day. However, success eventually crowned my efforts; and in half an hour's time I was the happy possessor of three real living larvæ of *D. galii* nearly full fed. The search also revealed at least half a dozen other mashed-up remains in various stages of growth. The three which I found alive were not far apart from one another, but all in different places. It was the first time my eyes had beheld their full glory, and splendid creatures they are indeed. Two of these larvæ, after wandering round the breeding-cage in the same uneasy manner as *stellatarum* before mentioned, have at length buried; the third, I am happy to say, is now a successfully preserved specimen for the cabinet. It seemed a shame to kill it; but I think the action is justified by the result, for I never had a smooth caterpillar which retained its shape and colour better when blown. I have since been able to complete my search of the bedstraw growing along the coast-line as far as the ladies' golf-course at Hall Road, some two miles north of Waterloo, but can find no more traces of *galii*, though *stellatarum* has been there sparingly. Had I not been bound by parochial ties I should doubtless have made a still more thorough search for this interesting species; but the amount of time I have already spent on these sandy wastes has been smiting my conscience somewhat. However, one doesn't like to be beaten by a caterpillar; and, let these writing-desk entomologists say what they will, *galii* does *not* visit us every year.

I should like to say much more as to my own views about this reappearance, about migration, spasmodic habits, and the rest; for though so much has been written on the subject in connection with *D. galii* (*vide* letters by Messrs. Briggs, Corbett, Sharp, Tugwell, and Tutt in the 'Young Naturalist' for 1889 and 1890), yet how little can really be said to be *known*. So many *theories* are held, some of them more ingenious than practicable; but at present we must all confess that it is a subject over which there are infinite possibilities, and one which calls forth a corresponding amount of interest. It is on this account, and because I believe that others will be as interested as myself, that I have presumed to trespass on so much of the valuable space of this journal. If I have unnecessarily gone into details at too great length, I apologise for it; but to me this is where the interest lies.

I am awaiting the next few monthly issues with keen expectation to see what others have experienced this year with *D. galii*.

26, Hamilton Square, Birkenhead: Sept. 22nd, 1897.

NOTES AND OBSERVATIONS.

Variation of Callimorpha dominula, *Linn.*—The most widely distributed, and perhaps the best known aberrant form of this species is var. *rossica*, Kolenati. This only differs from the type in having the hind wings yellow instead of scarlet. It occurs occasionally in almost all localities where the type is found; Mr. Sabine obtained two specimens of it from Dover this year.

Var. *persona*, Hübn., is, so far as I know, only found in Southern Europe; the hind wings are black, with an irregular and interrupted yellow patch at the base, and one, sometimes two, small yellow spots beyond this patch; the spots on fore wings are much smaller than in the type. Var. *italica*, Standfuss, has the spots on fore wings very little larger than those of var. *persona*, and the yellow markings on hind wings are more extensive. In both these forms the abdomen is black; the thorax of *persona* is black also, and without, or with very faint traces of, yellow marking.

In var. *bithynica*, Staud., all the spots on fore wings are yellow, but it does not differ materially in any other respect from the type. Var. *hamelensis*, Pflüm., has all the spots on fore wings white.

Of these named varieties, *rossica* is the only one known to me to occur in England, but Kent is noted for the production of a melanic form. I have only seen one English example of this aberration, but Mr. Leech has a fine specimen of it in his collection, together with one or more examples of the other named forms. This specimen, which is labelled "Berlin," has the fore wings pretty much of the typical colour, but the spots are black, and only noticeable when the specimen is viewed in a certain way; the hind wings are also black, with the typical markings showing in certain lights; thorax colour of fore wings, abdomen black; under surface uniformly rusty black.

It has been stated that black specimens of *C. dominula* are pathological aberrations, and have no scientific value. To my mind the melanic form described above is quite as important from a scientific point of view as the other varieties of the species. As regards *rossica*, *persona*, *italica*, and the black form, I consider that they represent stages in the development of *C. dominula*, and that the black form is probably the most ancient.

I may mention that a remarkable aberration of the species, quite unlike any of those previously referred to in these notes, is figured in the 'Entomologist' for 1883 (xvi. p. 1), and I should add that I have not seen vars. *lusitanica*, *bieli*, and *romanovi*.—Richard South; 100, Ritherdon Road, Upper Tooting, S.W.

Aberration of Pieris rapæ.—Mr. Sabine, of Erith, has been good enough to send for inspection some interesting varieties of certain species of Lepidoptera that he obtained this season. Among these are two female specimens of *P. rapæ*, each of which has a small black spot on hind wings, placed between veins 3 and 4. In one example the costal spot of hind wing is much larger than usual, and the apical patch of fore wing extends, almost without interruption, to vein 4. They were taken by Mr. Sabine at Folkestone in September, and were the only examples of the species that he netted.

Mr. A. M. Montgomery, of Ealing, has also obtained this extra-spotted form of the species this year. He writes:—"In a small brood of *P. rapæ* (from ova deposited in captivity) three females out of twenty-two examples of that sex have a small cluster of black scales between veins 3 and 4. Two males out of sixteen in the same brood have traces of an additional spot placed below the usual black spot on fore wings. All the specimens emerged between August 18th and 25th."

Previous to receiving specimens from Mr. Sabine, I had not noticed this extra spot on the hind wings of *P. rapæ*, but I had seen it in females of the summer brood of both English and Irish *P. napi;* also in females of the allied *P. extensa* var. *eurydice* and *P. melete* var. *mandarina*, both from China. In one or two examples of the latter, which seem to be exceptional instances, the outer area of hind wings has a more or less complete broad black or fuscous border, and it occurs to me that the black spot between veins 3 and 4 is probably a remnant of this border in the case of *mandarina*. Possibly the other species also had, in some ancient stage of their development, hind wings banded or bordered with black, and the black spots between veins 3 and 4 are vestiges of such bands or borders.—R. S.

Aberration of Epinephele tithonus.—Mr. G. W. Oldfield has sent for examination the variety of *E. tithonus* described by him in the 'Entomologist' for 1878 (xi. p. 228), as he considered that it agreed with the aberrant example of this species figured *ante*, p. 253. It differs, however, from Mr. Spindler's specimen in the ground colour being pale brownish buff and not pinkish ochreous; the black ring of apical ocellus on the fore wing is present in Mr. Oldfield's insect, but absent in the Luggershall example. At the first October meeting of the South London Entomological and Natural History Society, Mr. Montgomery exhibited an aberrant example of *E. tithonus* which appeared to me to be almost identical with Mr. Oldfield's variety. A somewhat similar form of *Epinephele* (*Satyrus*) *ianira* is figured Entom xi. p. 1.—R. S.

Aberration of Vanessa urticæ.—In two specimens of *V. urticæ*, bred by Mr. Sabine, the three blue marks nearest the apex of fore wings are ray-like in character, and extend inwards along the nervules almost or quite to the edge of the black marginal border.—R. S.

Aberration of Smerinthus tiliæ.—From a larva found at Northampton an example of this insect was bred in which the broad central band on the fore wings is reduced to a small oblong spot. The outer margins are also much suffused with reddish.—A. D. Imms; "Linthurst," Oxford Road, Moseley, Worcestershire, Oct. 1897.

[The central band of fore wings is usually more or less interrupted about the middle, the lower portion is often absent, and less frequently the upper portion also; but all gradations between the complete band and its entire absence occur. An interesting specimen is figured (Entom. xxvii. p. 50) in which there is no trace of the band on the left fore wing, while on the right fore wing the band is merely represented by a spot at the outer end of the discal cell.—Ed.]

Gynandrous Example of Dicranura bifida.—In this specimen, which was bred by Mr. Lewington, of Market Rasen, the right side is male and the left side female. So far as can be seen with the aid of a strong lens, the bilateralism seems to extend to the sexual organs, so that gynandromorphism is complete. Dorfmeister (Stett. Ent. Zeit. 1868, p. 181), theorising upon the origin of gynandrous specimens of Lepidoptera, suggests that part of a male germ and part of a female germ come together in the formation of the egg which is destined to produce a gynandrous example. Consequently, wherever one such specimen appears in a brood there should be another similar one resulting from the other parts of the two germs. As a test of the soundness of his views, he proposed that experiments should be tried by breeding whole broods from the egg, and instanced *Ocneria dispar* and *Lasiocampa quercifolia* as suitable species for the purpose. Further information on the subject will be found in a paper entitled "Über die hermaphroditische Anlage der Sexual drüsen beim Männchen von *Phyllodromia germanica*," published in 1890 (Zool. Anz. xiii. 451–457).

Gynandrous example of Lycæna icarus. — A specimen of *L. icarus*, sent to Mr. Sabine from Dover, has the left wings male in character on both surfaces, but the right wings are those of a female, the upper surface being coloured bright blue as in var. *cærulea*. The orange lunules on the upper surface of the right fore wing are present, but not clearly defined, whilst those of the right hind wing are partly absent.

Leucorrhinia dubia, *var.* — All the wings suffused with smoky saffron, the suffusion strongest at the wing bases, and weakening gradually towards the margins. A specimen taken on Whitegate Heaths (Delamere Forest), June 5th; the only one I have ever captured.—J. Arkle; Chester.

Acosmetia morrisii, Morris.—With regard to Dr. Knaggs's note on this insect (*ante*, p. 256), I should like to call attention to the fact that Mr. Meyrick has simply accepted the conclusions arrived at in Tutt's 'British Noctuæ,' vol. iv. pp. 99–100, where a discussion of the matter will be found, which has apparently been overlooked by Dr. Knaggs. It appears to me that, even if Morris's original description is inadequate, the work of Humphreys and Westwood should not be left out of consideration.—Louis B. Prout; 246, Richmond Road, N.E., Oct. 8, 1897.

White Female of Colias chrysotheme near Vienna.—On Aug. 25th last, when I was collecting *C. chrysotheme* on the high ground above Mödling, in the neighbourhood of Vienna, I was fortunate enough to take one white female, freshly emerged and in perfect condition, as indeed were most of its more gaily-coloured, if less interesting, companions. There was no doubt as to its identity, as neither *C. edusa* nor *C. myrmidone* were flying in that locality, and it resembled the other females exactly in size, shape of wings, and markings. About a week later I had the pleasure of a few minutes' conversation with Dr. Staudinger at Dresden, and upon making inquiries from him respecting this insect he informed me that a white variety of *C. chrysotheme* had never before come under his notice; it had no name, and he did not possess one in the whole of his immense collection. However, he said as this form occurred not unfrequently among other species of this genus, there was no reason why *C. chrysotheme* should be an exception.

I should be very glad if any continental collector would tell me if they have ever met with it. I also took, on Aug. 27th, in the same locality, a male specimen of this species in which the entire orange ground-colour of both wings was vividly shot with pink-mauve, a few of the females possessing a very slight inclination to the same. Is this a common feature in fresh specimens of *C. chrysotheme?*—M. E. Fountaine; 7, Lansdowne Place (East), Bath, Oct. 1897.

Monographs of the Genera of Lepidoptera.—Messrs. L. Reeve & Co. announce that they are about to publish a series of Monographs of the genera of Lepidoptera. The first of the series will be on the genus *Teracolus*, by Miss E. M. Bowdler-Sharpe; this will be illustrated by figures of all known species from drawings by Miss Maud Horman-Fisher.

Larva of Lophyrus pini feeding on Heather.—The sawfly larvæ referred to (*ante*, p. 69) emerged as perfect insects June 6th and 11th. Mr. W. F. Kirby, who kindly identified the species for me, writes:—"The sawflies prove to be *Lophyrus pini*, Linn., a common species enough; but yet you have made a discovery of some interest and importance, for Cameron says the Lophyridinæ feed exclusively on Coniferæ; and I am not sure that *any* sawfly has hitherto been recorded to feed on heath."—J. Arkle; Chester.

Bombyx rubi Larvæ.—I have several times kept these over the winter under a bell-glass in an orchard, feeding them with bramble. I have reared *Arctia fuliginosa* in the same way.—E. Meynell; Durham.

Further Note on Stauropus fagi. — Referring to my last note to you on *S. fagi* (ante, p. 270), I may say that the larvæ are now spinning up all right, also that, although they were eight days less in the egg state, they were eight days longer in the larval state than the spring brood. From the time the eggs were deposited to the time the first larva spun up exactly fifty-seven days elapsed in the case of each brood; so what the second brood gained in the egg state they lost in the larval state.—W. E. Butler; Hayling House, Oxford Road, Reading, Oct. 11, 1897.

Larva of Lophopteryx camelina feeding on Wild Cherry.—When sugaring last month for *Xanthia aurago*, I found a larva of *L. camelina* feeding on wild cherry. I cannot find it given as a food-plant for that species in any of the books I have. — W. E. Butler; Hayling House, Oxford Road, Reading, Oct. 11, 1897.

Larentia flavicinctata in Ireland. — A specimen of this species, taken in Antrim, was exhibited at the September meeting of the South London Entomological and Natural History Society.

CAPTURES AND FIELD REPORTS.

Ennomos autumnaria (alniaria) in South Hants.—A specimen of this rare moth was taken here (Portchester) during the third week in September, by Mr. Thomas Russell, who has kindly given it to me. It was in good condition. According to Kirby this insect is rare in England: is that so?—Madeline J. Stares; Portchester, Oct. 9th, 1897.

[Although the occurrence of this species in a wild state in England may, perhaps, be regarded as a rare event, it has been reared in numbers from ova obtained in the first instance from females captured in this country, chiefly on the south-east coast. There are other records of its having been found in Hampshire.—Ed.]

Plusia moneta at Walton-on-Thames.—On July 8th last I captured a specimen of *Plusia moneta* at Walton-on-Thames. It was in very fair condition.—C. N. Hughes; 21, St. Ermins Mansions, Westminster, S.W.

Acronycta alni at Light.—I was much pleased at taking a specimen of this insect, at light, on June 27th, and would like to know if it has occurred in this locality before. Does it usually come to light?—W. A. Tyerman; Damfield, Maghull, Lancashire. [There are several records of the occurrence of this species in Lancashire, but we do not recall any previous instance of its having been taken at light.—Ed.]

Acherontia atropos in Lancashire.—On Sept. 2nd this year a fine specimen of *A. atropos* (now in my possession) was captured by a friend, flying about in his house at Patricroft, a small town five miles from Manchester. This insect, so far as my experience goes, is a very unusual visitor to this neighbourhood, and as I have not seen recorded or heard of any other recent captures, I should be pleased to learn the experience of my brother entomologists in Lancashire with regard to the species.—W. Buckley; 17, Upper Moss Lane, Hulme, Manchester, Sept. 28th, 1897.

Sphinx convolvuli in Lincolnshire.—A specimen of *Sphinx convolvuli* was brought to me on August 19th, which had been picked up from the pavement a few yards from my door. It was seen to fly from a privet-hedge. On examining it, I found its abdomen torn as if a mouse or bird had been attacking it. I may add that it was about the middle of the day when the specimen was found.—W. Lewington; Market Rasen, Lincs.

Sphinx convolvuli in South Yorkshire.—On Sept. 6th last I had a specimen of *S. convolvuli* brought to me by the owner of a foundry in the centre of this town, who found it at rest on the wall of a workshop. Electric light is used on the premises, so no doubt that was the attraction. Unfortunately, when it reached me it had gone through the inevitable match-box treatment, and is not in the best of condition. This is the second Barnsley specimen I have.—J. Harrison; 7, Gawber Road, Barnsley.

Sphinx convolvuli in Worcestershire.—A fine specimen of this moth was taken at rest on Sept. 3rd; and on the 7th I saw a second specimen hovering over the bloom of *Nicotiana affinis* in my garden. By the time I had rigged my net it had disappeared.—W. Edwards; Malvern.

Sphinx convolvuli in Scotland.—A specimen of *S. convolvuli* was sent to me in September from Sutherlandshire.—W. M. Christy; Watergate.

Colias edusa in North Devonshire.—At Braunton, N. Devon, on Aug. 10th last, I captured two specimens of *C. edusa* and saw another, all within the space of five minutes, but did not see any more of this species during my stay of a fortnight there.—Chas. Bartlett; 58, Woodstock Road, Redland, Bristol, Oct. 2nd, 1897.

Colias edusa at Earnley, near Chichester.—I have seen, and know of, but one example of *Colias edusa* in this neighbourhood this season. The butterfly was taken at Earnley one day in the last week of August, by Master Arthur Buckell of this city.—Joseph Anderson Jun.; Chichester.

Colias edusa in the Portsmouth District.—Mr. Christy reports a specimen of *C. edusa* seen near Portsmouth in July.

Colias edusa and Sphinx ligustri in Pembrokeshire. — *C. edusa* was fairly abundant at Tenby in the latter part of August and beginning of September, chiefly on the sandhills ("The Burrows"), where on several days I saw five or six on the wing. *V. cardui* was scarce. *Sphinx ligustri* larvæ unusually abundant in the town and neighbourhood. I found ten in one garden, on lilac.—E. Meynell; Durham.

Pieris daplidice in Kent.—A female specimen of *Pieris daplidice* was captured on Aug. 27th last, at Dover, and an example (sex not mentioned) was seen at Herne Bay during the same month (Ent. Mo. Mag. October, 1897).

Ochsenheimeria vacculella in South London.—Mr. Percy Richards (Ent. Mo. Mag. October, 1897) states that this species was common in September in the neighbourhood of Brockley.

Coleoptera in 1897.—The following are among my captures of this order during the past year; where no locality is specially mentioned, Worcestershire is intended:—*Cicindela campestris*, Sutton Park (N. Warwickshire). *C. hybrida*, one from Hoylake. *Carabus violaceus*, *C. nemoralis*, the commonest of the larger Carabidæ here. *C. monilis*, scarce this year. *Pterostichus niger*, *Notiophilus biguttatus*, *Dytiscus marginalis*, *Ocypus olens*, *Timarcha lævigata*, common on mountain paths about Barmouth. *Dromius quadrimaculatus*, *Geotrupes stercorarius*, *G. sylvaticus*, *Helophorus rugosus*, one only, at roots of poplar. *Hister unicolor*, *H. cadaverinus*, *Elater pectinicornis*, *Meligethes æneus*, *Pyrochroa coccinea*, rather common. *Tomicus* (? sp.), very destructive to a couple of oaks in Sutton Park. *Anomala frischii*, received from Hoylake. *Apoderus coryli*, one on hazel at Barmouth. *Attelabus curculionoides*, by sweeping flowers, Sutton Park. *Otiorrhynchus picipes*, *Chrysomela distinguenda*, *C. polita*, *Apteropeda graminis*, *Phyllotreta nemorum*, scarce.—A. D. Imms; "Linthurst," Oxford Road, Moseley, October, 1897.

Autumn Collecting in Carlisle District.—Sugaring during this last few weeks has shown a decided improvement here, compared with the earlier part of the season. *Anchocelis litura*, *A. rufina*, *Cerastis vaccinii*, *Miselia oxyacanthæ*, and *Hadena protea* have been very common, while *Agrotis suffusa*, *Noctua glareosa*, *N. castanea* var. *neglecta*, *Orthosia lota*, *O. macilenta*, *Anchocelis lunosa* (new to Carlisle list), *Scopelosoma satellitia*, *Agriopis aprilina*, and *Calocampa exoleta*, have all occurred more or less freely. *P. gamma* has fairly swarmed everywhere. I have also seen about half a dozen *Vanessa cardui*; this is a very scarce butterfly here now. *V. atalanta* has been very common, both larva and imago; last season I only saw a single specimen. The larva of *Smerinthus ocellatus* has been extremely common on dwarf sallows, as also has the larva of *Dicranura vinula*. The "picture-makers" have played havoc with both. *Phalera bucephala* has been in myriads. Larvæ of *Dicranura furcula*, *Notodonta ziczac*, and *Gonoptera libatrix* have also occurred. The larva of *Bombyx rubi*, which last season was observed in unprecedented numbers, is extremely scarce this season; in fact, last year, I counted 175 in a few square yards; this year I only found twenty in a day's collecting.—J. E. Thwaytes; 8, Clement Place, Boundary Road, Carlisle, Oct. 18th, 1897.

SOCIETIES.

Entomological Society of London.—*October* 6*th*, 1897.—The Rev. Canon Fowler, F.L.S., Vice-President, in the chair. Mr. W. H. Bennett, of 15, Wellington Place, Hastings, and Mr. B. Tomlin, of 59, Liverpool Road, Chester, were elected Fellows of the Society. Mr. Merrifield exhibited specimens of *Aporia cratægi* and *Argynnis paphia*, subjected to high and low temperature during the pupal stage. In both species the examples which had been cooled were much darkened. Mr. Tutt showed for comparison the extremes of over 500 examples of *A. cratægi* bred or captured in Kent between 1860 and 1868, but none were so marked as those which had been artificially treated. Mr. Tutt showed a remarkable melanic aberration of *Nemeophila plantaginis*, in which all trace of the pale ground colour of the hind wings was lost; also a series of *Abraxas ulmata* captured during the past summer by Mr. Dutton in the neighbourhood of York. Previously aberrations of the species had been rare, but a large number of this series were suffused with blue-grey or smoky ochreous. Many of the aberrant forms were cripples. He also showed, for Dr. Riding and Mr. Bacot, bred specimens of both broods of *Tephrosia bistortata* from Clevedon, Somerset; and bred specimens of *T. crepuscularia* and its ab. *delamerensis* from York. Hybrids were exhibited between *T. bistortata* (male and female) and *T. crepuscularia* (male and female), between the former and the form *delamerensis* (male and female), and between the two latter crosses. The offspring of the first crosses were roughly divisible into two groups following the parent forms; those of the second tended to become mongrel in appearance. Hybridization led to the production of continuous broods, and certain broods tended to produce males only. The coloration became more intense with increase in the duration of the pupal stage. Dr. Dixey drew attention to the experiments on hybridization recorded in Dr. Standfuss's 'Handbuch der Paläarktischen Gross Schmetterlingen,' and gave a summary of the results. Mr. Champion showed, for the Rev. J. H. Hocking, an example of the long-bodied moth *Satacoma agrionata*, from New Zealand; also one of *Protopaussus walkeri*, Waterh., from China, the subject of a later communication; and specimens of the rare *Emblethis verbasci*, F., from the Scilly Isles. Mr. Jacoby showed a Halticid beetle with a singular abnormality, the side-margin of the prothorax being split and embracing a long process. Dr. Chapman exhibited and described varieties of *Spilosoma lubricipeda* and *Acronycta psi*, bred by Dr. Riding. In the latter species the characters of the different races were very stable. Mr. Burr exhibited a Mantis, *Phyllocrania illudens*, from Madagascar, with a close resemblance to the dead leaves among which it lived, some of which were shown with it. A new British coccid, *Kermes variegatus*, from Kent, was exhibited by Mr. Waterhouse. Mr. G. C. Griffiths read a paper on "The Frenulum of the Lepidoptera." Mr. Kirkaldy communicated a "Preliminary Revision of the Notonectidæ, Part I."; and Mr. Waterhouse the "Description of a new Coleopterous Insect of the family Paussidæ."

[Reports of other Societies are unavoidably postponed until December.]

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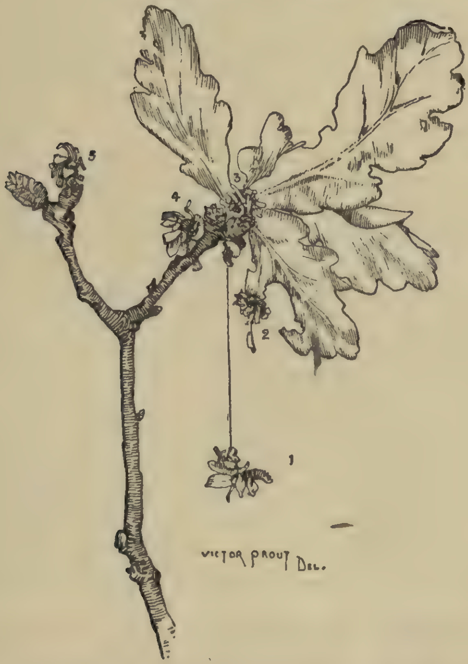
THE LARVA OF *PHORODESMA PUSTULATA* (*BAJULARIA*).

By Henry A. Auld.



There is probably no more interesting example of protective resemblance than that afforded by the larvæ of *Phorodesma*. So much do they liken themselves to their surroundings that old collectors have times out of number unconsciously ejected them from the beating-tray; and even when they have been pointed out to the keen-sighted ardent young entomologist, so much surprise has been expressed at their quaint appearance, that I think it not amiss to ask the indulgence of our Editor in reproducing a beautiful drawing which has been lent to me by my kind friend Dr. Knaggs, whose son-in-law Mr. Victor Prout has caught and portrayed the larvæ in just such positions as they assume in nature.

The first time that I met with the larvæ of *P. pustulata* (*bajularia*) in any numbers was when beating into a Bignell tray in the New Forest, about the middle of May of the present year. A succession of severe night-frosts had cut off all the young foliage from the oak-trees, leaving in their place only the buds, which were bursting out afresh. Larvæ were not plentiful, and for awhile it looked like returning with empty boxes, but presently *Boarmia roboraria* yielded to the beating-stick; then, later on, it would be my luck to bring down a couple of *Hylophila quercana* at a stroke. There were, of course, many blackened oak-leaves and pieces of dead wood, with an occasional larva of *Cleora lichenaria* in the beatings; and it was when examining such a mixture that I spied some brown oak-bud husks standing up, a trembling mass on the tray. My acquaintance with the larva of *P. smaragdaria* at once led me to detect its full-dressed relation *P. pustulata*, which, when picked up, slipped through my fingers, hanging by a silken cord like the individual in the illustration. In that position who could help holding it in admiration, wondering at the facile way it fools the naturalist and outwits the bird and its other enemies. I enjoyed a hearty laugh when I got the larvæ home, for an oak-bud and a larva were in the position shown (5, in figure) when I asked one of our progressive entomologists whether he happened to be acquainted with it. "No," said he, "I should like to see it." So I handed him the twig, which he turned round and round, and then asked, "Where is the brute!" thus reminding one of the other *Phorodesma*—*P. smaragdaria*, of which it has been said: "I shall show you the larva and you shall not see it." For ten long months *P. pustulata* leads a caterpillar life, anchoring itself tightly by a silken fastening to the oak to withstand the winter winds. It is very active when the genial warmth of spring sets it to work to gain the imago state, and it may then be seen as in the figure, sleeping, waking, breakfasting, and taking exercise on the trapeze.

A most excellent description is given in the pages of the E. M. M. (vol. ii. pp. 91 and 114) respecting the life-history of *P. bajularia* (*pustulata*). It would be superfluous for me to add to the information which the Revs. E. Horton and John Hellins have there supplied. My desire is to try to make the larva familiar to the collector, and I trust that these few remarks may have the desired result.

ACOSMETIA (MIANA) ARCUOSA, Hw., var. *MORRISII*, Morris.

By H. Guard Knaggs, M.D., F.L.S.

Referring to my reproduction of the original description of *morrisii* in your October number (*ante*, p. 256), Mr. Louis B. Prout (*ante*, p. 296) calls attention to the fact that Mr. Meyrick simply accepted the conclusions arrived at by Mr. Tutt, which is satisfactory, though only in so far as it shows the correctness of my supposition that the writer in the 'Handbook' had never seen either *morrisii* or the original description of it. I can assure Mr. Prout that I have not overlooked either Mr. Tutt's "discussion" on *morrisii* referred to, or the article in which he candidly explained the peculiar method of reasoning by which he arrived at his conclusions; and as the latter seems to me to be particularly interesting and instructive, I should like, with the editor's permission, to place it before the readers of the 'Entomologist.' The passage ('Ent. Record,' iv. pp. 72, 73) runs as follows:—

"Fig. 1 represents *Acosmetia morrisii*, Dale, a species we have known for some time as *bondii*, Knaggs. It has always appeared wonderful to me that a species turned up at Folkestone as late as 1861 should then have required a new name; this remarkable circumstance I have repeatedly communicated to entomological friends. I was set on the move about this species first by a note which Mr. Dale wrote to the 'Ent. Record,' vol. i. p. 34, in which he refers *morrisii* to *arcuosa* as a pale var. I wanted to know more about *morrisii* for my book on the British Noctuæ; but for some time I could not find anything. However, one day, looking through the last plates of Noctuæ in Humphrey and Westwood's 'British Moths,' I came across a figure, at the sight of which I ejaculated, '*extrema*, Hb.—*bondii*, Knaggs.' I turned to the letterpress, and the name was *morrisii*. I immediately went to my cabinet, satisfied myself as to its identity with *bondii* at once, both from the figure and letterpress (the hind wings of the figure are unmistakeable), and then set to work to learn more. The specimen from which the figure was made was captured by Mr. Morris himself at Charmouth, in the same line of coast, and about ten miles from the well-known locality for *bondii* at Lyme Regis, discovered by Mr. Wormald; and afterwards captured there in plenty by Messrs. Goss and Tugwell. The greatest puzzle about the whole affair, is to think that a species described by Mr. Dale in the 'Naturalist,' vol. ii. p. 88, and errata, figured by Humphrey and Westwood in 1843 or 1844 under Dale's name, should be re-described in 1861 (eighteen years at the most), and accepted by entomologists without question. Perhaps they lived more slowly in those days; at any rate, they appear to have lived with their eyes partly shut. I am not particularly surprised that Dr. Knaggs re-described the species. The few years that he was devoted to the study of Lepidoptera brought many new things to light, which have since sunk into darkness; but I am astonished that men of comparatively good scientific knowledge, with Humphrey and Westwood always in their hands as their every-day reference book, did not detect the blunder committed by a (may I say?) then comparative beginner. Perhaps it was then as it is now. If work be not done in the groove laid down by our extra-scientific friends, it is something to be ignored and jumped upon. This it appears to have been taken for granted, was bound to be correct, and did not require enquiring into. Fancy the lepidopterists of to-day letting some comparative beginner re-describe a species only eighteen years old; and yet this is what the entomologists of 1861 did. *Bondii*, Knaggs, will, therefore, have in future to be labelled *morrisii*, Dale."

Mr. Prout evidently doubts the adequacy of Mr. Morris's description to sink *bondii* as a synonym of *morrisii;* and certainly *bondii* is not of a pale straw colour assimilating to the colour of sun-dried grass (indeed the contrast between the almost chalky white moths settled upon the dark green foliage of their food-plant on a summer's evening is about as striking as can well be imagined); neither does it possess faint narrow brown lines diverging towards the margin; nor is it attached to a grass which becomes desiccated in summer; nor has it ever, as far as I can learn, been known to fly by day. And, further, a liassic soil, such as occurs at Charmouth, seems to me to be a very unlikely one for *bondii* to inhabit. On the other hand, the description is fully adequate to identify *arcuosa*, male, especially if worn, when the dotted elbowed line is apt to become indistinct or obsolete, the diverging lines to show up more conspicuously, and the hind wings to fade, as appears to have been the case in the specimens named *morrisii.*

Mr. C. W. Dale (son of the late respected Mr. J. C. Dale, and inheritor, I believe, of his father's collection), who has, in all probability, seen the insect, if it was considered worth preserving, and heard from his father's lips its history from its "discovery" to its suppression, ought surely to be better qualified to give an authoritative opinion on *morrisii* than any other entomologist who has never enjoyed these advantages. Mr. Dale has stated decidedly ('Ent. Record,' vol. i. p. 34) that *morrisii* is a pale variety of *arcuosa;* and every line, every word of Mr. Morris's description confirms his decision. The alar expanse, build, colour, and markings,—the narrow brown lines diverging towards the margin (not to mention the slightly brown costa, noted by Humphrey and Westwood);—all agree with *arcuosa.* The starting up and flying by day, when alarmed, is a well-known habit of *arcuosa;* and the long grass, which, as its seed ripens, becomes parched up and more or less bleached in the hot rays of the summer sun, points to *Aira cæspitosa*, the food of *arcuosa*.

Folkestone, November 4th, 1897.

Note.—In reading Mr. Morris's description, his meaning will be much simplified by bearing in mind that by "the wings" he meant *all four wings*, so that "the upper part of the wings" = *the upper wings*, just as "the wings underneath" (or "the under part of the wings") = *the under wings*.—H. G. K.

NEW SPECIES OF *ANDRENA* FROM NORTH AMERICA.

By T. D. A. Cockerell, N. M. Agr. Exp. Sta.

The bees of the genus *Andrena* are very numerous in North America, but up to the present time they have received comparatively little attention. Mr. F. Smith, many years ago, described a number of species from Canada and the Eastern United States, as well as five from Vancouver's Island. Mr. Cresson described several from Texas, and one from New Mexico. Mr. Ashmead described four collected by the present writer in Colorado. L'Abbé Provancher made known some new species from Canada, and two from California. From Mexico six have been described by Smith, and one by Gribodo.

Subsequent to most of the above-mentioned publications, Mr. Robertson made a careful study of the *Andrenæ* of Illinois, and Miss J. E. Casad and the present writer studied those of New Mexico, and in each of these regions most of the species were found to be still undescribed.

So far, one hundred and fourteen species of *Andrena* have been described from North America (including Mexico). The European list is much longer.

(1.) Andrena pascoensis, n. sp.

♀. Length about 15 mm., head and thorax black, *legs and abdomen mostly rufous*. Pubescence greyish white. *Face about as broad as long*, its sides covered with greyish white pubescence. *Clypeus with a diffused central yellow patch;* end of scape, and first flagellar joint, ferruginous beneath. Mesothorax moderately shiny, microscopically tessellate, with large punctures, becoming extremely dense at sides; enclosure of metathorax ill-defined. Tegulæ amber colour, transparent; *wings strongly suffused with yellowish*, except the apical cells; *apex dusky* with a slight violaceous lustre; nervures and stigma pale ferruginous. Legs ferruginous; the coxæ, anterior femora behind, middle femora except apical third, and posterior femora except extreme tip, black; pubescence of basal joints of tarsi ferruginous. Abdomen rather shiny, broad, strongly and closely punctured, bright ferruginous; base and part of sides of first segment, and spot on each side of second, black; third and following segments suffused with black dorsally and ventrally, the apex quite dark. The second to fourth segments have dense creamy-white apical hair-bands, that on the second being slightly interrupted in the middle; fifth segment and apex covered with glittering very pale orange hair.

Hab. Pasco, Washington State, May 25th, 1896 (T. Kincaid).

A. pascoensis differs from *A. argemonis* by the broader abdomen with less parallel sides, the broader face, the greyish white (instead of fulvous) pubescence, the pale nervures, &c. From *A. fastuosa* it differs by having more red on the abdomen and legs, and the colour of the pubescence.

(2.) Andrena trevoris, n. sp.

♂. Length about 9 mm.; black with thin greyish white pubescence; clypeus yellow with two black spots; the four hindmost tarsi pale ferruginous. This closely resembles *A. bipunctata*, differing as follows:—Size larger; clypeus higher and less produced at sides, chrome yellow instead of lemon yellow; flagellum dark, scarcely brownish beneath; area between eyes and ocelli finely longitudinally striate; vertex shiny and more distinctly punctured; abdomen shiny, with small and sparse but distinct punctures; four hind tarsi light ferruginous; abdomen rather more hairy; nervures and stigma dark reddish brown; stigma smaller relatively to the size of the insect; third submarginal cell longer.

Hab. Olympia, Washington State, June 12th, 1895 (T. Kincaid).

(3.) Andrena apacheorum, n. sp.

♀. Length 10 mm.; black, with rather thin but tolerably long cream-coloured pubescence. *Abdominal segments* 1 *to* 4 *with thin apical bands of long hair, not interrupted;* fifth segment and *apex with fuscous hair.* Process of labrum broad and truncate; clypeus strongly punctured, with an ill-defined impunctate line; facial quadrangle about as broad as long; area between eyes and ocelli minutely lineolate or striatulate; vertex dull with sparse shallow punctures; antennæ dark, slightly ferruginous beneath towards tip; mesothorax and scutellum dull, minutely tessellate, practically impunctate; enclosure of metathorax ill-defined, minutely roughened, the areas on each side of it distinctly punctured; abdomen minutely tessellate, impunctate; tegulæ black; wings dusky hyaline, nervures piceous, stigma light brown with a dark margin; first submarginal cell hardly as long as second and third together; legs black with pale pubescence, that of the tarsi fuscous.

Hab. At flowers of *Bigelovia graveolens*, Tularosa Creek (near Blazer's Mill), New Mexico, August 23rd, 1897 (E. O. Wooton).

A. apacheorum is closely related to *A. fimbriata*, but the pubescence is not so yellow, that on the four hindmost tibiæ is pale instead of fuscous or black, and the face is not so broad. The *fimbriata* used for comparison is from Hartford, Ct., September 15th, 1895 (S. N. Dunning). *A. electrica*, the other New Mexico species having dark hair at the apex of the abdomen, differs at once by the pale pubescence of the tarsi, and the distinct though minute and sparse punctures of the abdomen.

(4.) ANDRENA MENTZELIÆ, n. sp.

♀. Length 12½ mm.; black, the *pubescence pale yellow*, rather long and dense, whitish on thorax beneath, legs, and abdomen. Clypeus naked except at extreme sides, very shiny, impunctate in middle, punctured at sides; flagellum dark, with the faintest coffee-brown tint beneath; facial depressions covered by minute appressed pubescence; vertex sparsely but distinctly punctured; hair of occiput and cheeks long and abundant; process of labrum broad and truncate; *mesothorax dull, minutely tessellate, practically impunctate;* enclosure of metathorax minutely roughened, ill-defined; tegulæ obscure testaceous, appearing black in some lights; wings dull hyaline, apical margin somewhat dusky; stigma ferruginous with a dark margin; nervures fuscous; legs black, small joints of tarsi rufescent; abdomen only feebly shiny, minutely tessellate, with minute very sparse punctures; margins of all the segments with bands of long pale hairs; apex with slightly yellowish hair. Venter with white hair.

Hab. At flowers of *Mentzelia nuda*, Santa Fé, New Mexico, August 3rd (Ckll., 4132).

Cresson's description of *A. miserabilis* nearly applies to *A. mentzeliæ*, but the nervures of *miserabilis* are honey-yellow, and the abdomen is "shining, extremely minutely punctured." Provancher, who recognized *miserabilis* in a female caught at Ottawa, says the abdomen is "brilliant," and that the hair bands on the second and third segments are more or less interrupted. *A. hirticincta* differs from *mentzeliæ* by the brown pubescence of the tibiæ and tarsi and the black hairs of the end of the abdomen. *A. permitis* differs at once by the densely punctured abdomen. *A. texana* is only known in the male, but it is not likely to belong with our insect, on account of its shining abdomen. From *A. apacheorum* the present species is known by its larger size, and the light pubescence at the end of the abdomen.

(5.) ANDRENA GRANDIOR, n. sp.

♀. Length 11 mm.; black, with short sparse ochraceous pubescence. Belongs to Robertson's second group (Tr. Am. Ent. Soc., 1891, p. 50). Facial quadrangle about as broad as long; lateral facial depressions well-marked, covered with appressed pubescence; a patch of white hair on each side of the antennæ; clypeus exposed, shining, strongly and closely punctured, with no distinct smooth line; vertex with extremely large punctures; mesothorax with very large and strong, close punctures; scutellum and postscutellum with very large punctures; enclosure of metathorax very distinct, very strongly longitudinally ridged, bounded behind by more or less of a rim; tegulæ piceous; wings smoky hyaline, barely darker at apex; nervures and stigma piceous; legs black; abdomen shining, rather finely but strongly and closely punctured; dorsal surface of first four segments practically nude, except for a well-marked patch of white hair on the lateral margins of the second to the fourth, some scattered glistening yellowish hairs across the middle of the third and fourth, and an indistinct fringe of very short hairs on the extreme margins of the second and third; fifth segment and apex clothed with orange-fulvous hairs; ventral segments with rather long fringes of white hair.

Hab. Olympia, Washington State, June 18th, 1895 (T. Kincaid).

A. grandior is related to *A. rugosa*, but it is larger, and the stigma is quite differently coloured. The base of the metathorax is similar in the two species.

(6.) ANDRENA STRIATIFRONS, n. sp.

♀. Length 11½ mm.; black, with moderately long and dense fulvous pubescence. Belongs to Robertson's second group. Facial quadrangle slightly broader than long; lateral facial depressions with appressed pubescence; clypeus hairy, but surface visible, shining, closely and strongly punctured, *no smooth line; front below ocelli strongly longitudinally striate;* vertex dull, with shallow obscure punctures; flagellum wholly dark; mandibles dark; basal process of labrum broad and rounded at end; mesothorax rather dull, with very large and close punctures, lacking in the centre; scutellum shiny, with very large punctures; sides of metathorax strongly rugoso-punctate; the enclosure strongly longitudinally wrinkled, bounded behind by a sharp edge; tegulæ piceous; pubescence of thorax a lively orange-fulvous; wings hyaline, faintly clouded at apex; nervures and stigma ferruginous; in the type specimen there are on one side only two submarginal cells, on the other three, but even here the second transverso-cubital nervure is incomplete below; legs black, with pale fulvous pubescence, hind tibiæ ferruginous suffused with black, *hind tarsi wholly ferruginous;* abdomen shining, *punctures scattered, minute and hardly visible, except the bases of the segments, which are very distinctly though rather sparsely punctured;* second to fourth segments with lateral patches of pale fulvous hair, representing very broadly interrupted bands; fifth segment clothed with fulvous hair at apex and sides; anal fimbria dark rufous. The longitudinal wrinkles of the metathoracic enclosure, while strong, are much weaker than those of *grandior*, and the intervals between them are granular.

Hab. Olympia, Washington State, April 19th, 1894 (T. Kincaid).

(7.) ANDRENA MACGILLIVRAYI, n. sp.

♀. Length 10 mm.; black, pubescence fulvous on occiput and thoracic dorsum, otherwise whitish or dull white. Facial quadrangle somewhat broader than long; lateral facial depressions with appressed pubescence; sides of face and area between antennæ with long pale yellowish grey pubescence; clypeus with the surface not concealed, shiny *but minutely tessellate*, strongly and rather closely punctured, with a low median longitudinal ridge; front below ocelli strongly striate; vertex with irregular weak punctures; first joint of flagellum longer than second and third together; last joint feebly ferruginous; mandibles dark; *process of labrum strongly produced, narrow, rounded at end, shaped like the end of a finger;* thorax with long rather dense hair; *mesothorax dull, minutely rugulose, with shallow punctures; enclosure of metathorax minutely rugulose, poorly defined;* tegulæ shining dark brown; wings yellowish hyaline; nervures (except black subcostal nervure) and stigma ferruginous; first submarginal cell on cubital nervure about as long as the two others together; legs black, with whitish pubescence, becoming shining fulvous on the tarsi; *hind tarsi fusco-ferruginous;* abdomen fairly shiny, *minutely tessellate, the sparse weak punctures hardly noticeable;* hind margins of segments very narrowly testaceous; abdominal dorsum with thin scattered pubescence; hind margins of the second to fourth segments at sides with white pubescence, representing broadly interrupted hair-bands; *margin of fifth segment, and apex, thickly clothed with sooty or purplish fuscous hair;* ventral segments fringed with white hair.

Hab. Ithaca, N. Y., April 21st, 1890 (A. D. MacGillivray).

An ordinary-looking species, best distinguished by the clypeus and process of labrum. It is related to *A. salicis*, Rob., but is larger, and differs in the process of labrum and the abdomen without continuous bands.

(8.) ANDRENA NIGROCÆRULEA, n. sp.

♀. Length 10½ to 11½ mm.; dark blue, pubescence of thoracic dorsum ochraceous, elsewhere black; face covered with black hair; clypeus strongly punctured; antennæ black; mesothorax with shallow punctures; enclosure of metathorax minutely roughened, triangular, not bounded by a ridge; tegulæ shining black; wings dusky; nervures and stigma piceous; pleura with black hair; legs black, with black pubescence; abdomen minutely tessellate, impunctate, *apex densely clothed with black hair.*

♂. Length 9 mm., much more slender; antennæ very long, wholly black; wings clearer; pubescence long and thin, *all yellowish white, except black at sides of face and sides of occiput.* Vertex and mesothorax dull.

Hab. Olympia and Seattle, Washington State, in May (T. Kincaid). Many specimens.

Differs at once from *A. cerasifolii* by the impunctate abdomen. From *A. cærulea* and *A. geranii* it differs by the black hair at the apex of the abdomen.

Mesilla, New Mexico, U.S.A., October 24th, 1897.

A CATALOGUE OF THE LEPIDOPTERA OF IRELAND.

By W. F. de Vismes Kane, M.A., M.R.I.A., F.E.S.

(Continued from p. 290.)

Lobophora sexalisata, *Hb.* — Local and scarce. It has occurred in localities in the north, south, east, and west, as follows:—Derry, rare (*C.*); Killarney (Torc and Mucross), rare; Glendalough, Co. Wicklow, one; Clonbrock, Co. Galway, two (*R. E. D.*).

Lobophora halterata, *Hufn.*—Local, though widely distributed, and more numerous in its haunts than the foregoing, but it is rarely to be met with in Ireland, though I believe not uncommon in many English counties. Recorded in 1872 as abundant at Limerick, by Mr. Talbot; Farnham, Cavan; Favour Royal, Tyrone, a few; Pontoon on L. Conn in Mayo, a few; Clonbrock, Co. Galway, scarce (*R.E.D.*); Castle Bellingham, Co. Louth, four (*Thornhill*); and on an island in L. Erne (*A.*).

Lobophora viretata, *Hb.* — Widely distributed, local, and fairly numerous in its haunts. Killarney (*B.*), where, at the foot of Torc Mt., I also took a small series on the stems of Scotch fir, a favourite resting-place for this species; Cappagh, Co. Waterford; Bray (*Bw.*) and Powerscourt, several, Co. Wicklow; Farnham, Cavan; Cookesborough, Co. Westmeath; Altadiawan, Co. Tyrone, one (*M. F.*); Drumreaske, Monaghan; Clonbrock, Co. Galway (*R. E. D.*).

Lobophora carpinata, *Bork.*—Although, curiously enough, this species escaped the notice of so active a collector as Birchall, it is to be found in most suitable localities in Ireland, sometimes in considerable abundance. The usual Irish form is similar to English specimens I have seen from Birmingham and other districts, being pale and slightly pencilled; but at Clonbrock, where I have found it one of the most abundant of spring geometers, the two narrow bands across the centre of the fore wing are strongly marked and slightly fuscous, and often coalesce toward the inner margin. Such specimens as are in my cabinet are mostly females, and Mr. Dillon informs me that this aberration becomes proportionally more numerous as the season advances, which would perhaps suggest that the character is more developed in that sex. I have a few from Westmeath and Tyrone, also strongly marked. No Irish examples, however, that I have seen can compare with the dark-banded Scottish form, either in the tone of shading of the bands, or in the fuscous ground colour which characterizes many of them. A green tinted variety I have taken in south Devon does not appear to exist here. Limerick (*Talbot*); Killarney; Favour Royal, and Altadiawan, Tyrone; near Derry (*C.* and *W. E. H.*);

Markree Castle and Rockwood, Sligo; Killynon (*Miss R.*) and Cookesborough, Co. Westmeath; near Ballinasloe; and at Clonbrock, abundant, Co. Galway. In Co. Wicklow it is generally distributed, but not numerous, *e.g.* Arklow, Glenmalure (*G.V.H.*), and Wooden Bridge (*M. F.*).

Thera juniperata, *L.*—Clonbrock (*R. E. D.*), Entom. xxvii. 191. Only a few specimens. Juniper is not indigenous in the district, but it is possible that this species may have been introduced into the pleasure-grounds of the demesne with imported plants of ornamental varieties.

Thera simulata, *Hb.*—By some oversight this is entered in Birchall's Catalogue as "common." He probably referred to *T. simularia*, Bdv., a variety of the following species. This interesting moth was first discovered in Ireland by Mr. Russ, at Knocknarea, near Sligo, where scanty dwarf juniper plants struggle to exist on the stony wind-swept hill side. From larvæ he kindly supplied to me I bred a series of richly coloured specimens of a warmer tint than any I have seen from Scotland. It is also not uncommon about Merlin Park, Galway; and probably in all localities in that county where its food-plant flourishes, as at Ardrahan, &c., it will be found. Mr. W. E. Hart also took it on the Inishowen shores of L. Foyle, Co. Donegal. At Glenveagh, a most picturesque valley in that county, the mountain sides are luxuriantly clothed with tall juniper bushes. Here we may expect to find all the indigenous species which feed thereon, waiting the net of the first comer.

Thera variata, *Schiff.*—This species, so unstable in its character, is found throughout Ireland abundantly. Until the principal variations are critically tabulated, I am not disposed to concede with Newman that the type is absent. Staudinger describes the type as "forma griscescens," Berce ('Faune Ent. Française') as "d'un gris un peu olivâtre, et saupoudré de blanchâtre, avec l'espace basilinéaire et une bande médiane noirâtre ou brunâtre," &c. Sven Lampa, "Askgråaktig." There are Irish forms which correspond pretty well to the above, with a blackish brown median, and dark basal band, but without any olive tint in the ground colour. Three Scandinavian examples in my cabinet from Sven Lampa are very pale forms. That sent as type is similar to many of the slightly marked grey Irish specimens, with a pale brown median band and scarcely traceable basal band. The second seems referable to *fulvata*, Fb. (*obeliscata*), being very similar to *Thera firmata*, Hb., but with the median band slightly more distinct. The third appears to correspond with var. *obliterata*, White, which is apparently a synonym of ab. *simularia*, Bdv. It is of a unicolorous ochre-grey, with pale fulvous central band not edged with any dark line. This form is found in Ireland occasionally. A very melanic aberration was taken by me in the autumn, at Mote Park, Roscommon, of a sooty black with deeper black median band, the hind wings also being very sooty. A very similar one was captured by Mr. Dillon at Clonbrock. These are blacker than a Barnsley specimen in my cabinet, which is of a unicolorous dark warm brown, the median band being obsolete.

Thera firmata, *Hb.*—Very few have been taken in Ireland, Cookesborough, Co. Westmeath (*Miss R.*); Howth (*G. V. H.*); Enniskillen (*Col. Partridge*).

Hypsipetes ruberata, *Frr.*—The greater number of specimens which do duty for this species in British cabinets appear to me to be referable to a form of *T. trifasciata.* The present species, which is the larger, is decidedly scarce in Ireland. Specimens (mostly single) have been taken as follows:—Favour Royal, Co. Tyrone; Killynon, Co. Westmeath (*Miss R.*); Rockwood, Sligo; Killarney; and Clonbrock, Co. Galway (*R. E. D.*).

(To be continued.)

ORNITHOPTERA (POMPEOPTERA) IRREGULARIS, n. sp.

By Walter Dannatt, F.E.S.

Male.—Anterior wings satiny bronze-black. Posterior wings satiny black. The golden yellow commences one mm. below the costal nervure, and continues with an irregular outline across the discoidal cell. There is a small streak of colour within the anal angle, and close to the cell. Between the discoidal cell and the costal nervure are five small golden yellow wedge-shaped patches, each differing in form and size, the smallest (in the third space) projecting only six mm. from the discoidal cell. Collar crimson.

This specimen is no doubt closely allied to *Ornithoptera helena*, both having the same habitat (New Guinea).

THE ASIATIC DISTRIBUTION OF BRITISH GEOMETRIDÆ.

(Continued from p. 247.)

Tephrosia luridata, Bork.
Ectropis luridata, Meyr.

Mr. Leech remarks: "Japanese specimens are rather smaller than European examples; they are also more thickly powdered with brownish, and the pale spot on outer marginal area of primaries is of less size."

The species is also recorded from Amurland.

TEPHROSIA BIUNDULARIA, Bork. = *crepuscularia*, Hb.
Ectropis biundularia, Meyr.

Occurs in Amurland, Corea, Japan, Central and Western China, North-West Himalayas, Sikkim and Khásis.

Mr. Leech remarks: "This species varies considerably in size both in China and Japan. The smallest specimen is only 26 millim. in expanse, whilst the largest measures 58 millim. *Nikkonis*, Butl., is a strongly marked example of the type form, and, although rather larger, is not otherwise different in any material respect from specimens I have seen from Scotland. *Excellens*, Butl., is an unusually large form of the species; I have examples of it from Japan and Yesso."

TEPHROSIA PUNCTULARIA, Hb. = *ignobilis*, Butl.
Ectropis punctularia, Meyr.

This species is found in Eastern Siberia, Amurland, Japan, Yesso, and North-East China.

CLEORA (BOARMIA) GLABRARIA, Hb.
Selidosema glabraria, Meyr.

Occurs in Japan, Kurile Islands, and Western China.

BOARMIA REPANDATA, Linn.
Selidosema repandata, Meyr.

Special forms of this species have been developed in Eastern Asia, but some of the specimens, however, from Central and Western China, are identical with European modifications of the type form.

Represented in East Siberia, Amurland, Central, Western, and North-East China, Thibet, and North-West India.

BOARMIA CINCTARIA, Schiff. = *insolita*, Butl.
Selidosema cinctaria, Meyr.

A pale form (*insolita*, Butl.) occurs in Japan and Amurland, but some of the Japanese specimens are not separable from European examples.

BOARMIA ROBORARIA, Schiff.
Diastictis roboraria, Meyr.

Occurs in Amurland, Japan, Yesso, and Kiushiu.

Some of the Japanese specimens are strongly marked (*arguta*, Butl.); others are referable to var. *infuscata*, Staud. (=*lunifera*, Butl.); others, again, are quite typical.

BOARMIA CONSORTARIA, Fb.
Diastictis consortaria, Meyr.

Recorded from Amurland, Isle of Askold, Corea, Japan, and Central and Western China.

Neither Japanese nor Chinese specimens are quite of the normal European form as regards colour; the former are darker (*conferenda*, Butl.); the latter are tinged with cinnamon-brown, and are also larger in size than the type.

Boarmia abietaria, Hb.
Deileptenia abietaria, Meyr.

Only recorded from Japan; the specimens are larger than European, and the markings are more pronounced.

Abraxas sylvata, Scop.

A very variable species in Eastern Asia, and a large number of the forms have been described as distinct species. All the named forms are, however, connected one with the other, and with the typical form by intergrades. Mr. Leech states that the largest specimen in his series measures 60 millim. in expanse, and the smallest 31 millim.

Occurs in Amurland, Japan, Corea, Central and Western China, N.W. Himalayas, Sikkim, Assam, Nilgiris, and Penang.

Abraxas grossulariata, Linn.

Recorded from East Siberia, Amurland, Japan, and Central China.

Referring to the form *conspurcata*, Butl., from Japan, Mr. Leech observes: "The markings on secondaries are certainly more decided than in any European specimens of *grossulariata* that I have seen, but the pattern is only a complete development of markings seen more or less clearly indicated in the majority of European *grossulariata*. Neither of the Japanese forms of this species diverges so widely from the type as do certain varieties of the species known to British entomologists."

Var. *sinicaria*, Leech, from Central China, has the markings on primaries "somewhat similar to those of *A. picaria*, but the markings on secondaries are much the same as in typical *A. grossulariata*, though not so pronounced—fuscous instead of black on all the wings. The yellow markings are in all cases less distinct, and in several specimens entirely obsolete."

Lomaspilis marginata, Linn. = *opis*, Butl.
Abraxas marginata, Meyr.

Occurs in Amurland, Japan, Yesso, and Central China.

Most of the Japanese specimens have rather black markings; in some examples the central band of each wing is entire, but in others it is twice interrupted (var. *opis*, Butl.).

Subfamily Larentiinæ.

Anaitis plagiata, Linn.
Eucestia plagiata, Meyr.

Recorded from Japan, Afghanistan, North-West Himalayas.

Mr. Leech states that "the examples of the first brood in Japan are paler, and those of second brood darker than European specimens." Sir George Hampson, after describing the Indian form, remarks that the European form "usually has the dark lines and patches of fore wings more prominent and the latter tinged with rufous."

SCOTOSIA RHAMNATA, Schiff.
Philereme rhamnata, Meyr.

This species is represented in Japan by a form which Mr. Leech describes as var. *japanaria* which "differs from the European type in being larger and having a pale grey-brown coloration; the transverse lines are identical in number and form, but the space between the two central angulated lines is not darker. On the under surface the difference of colour is not so pronounced and the markings are typical."

Not recorded from any other part of Eastern Asia.

SCOTOSIA DUBITATA, Linn.
Hydriomena dubitata, Meyr.

Occurs in Japan and Central and Western China.

The specimens from China and Japan appear to be referable to var. *cinereata*, Steph., as they are paler in colour than the type, and the markings are not so well defined. Mr. Leech considers that *Scotosia* (*Thriphosa*) *oberthüri*, Hedem., from Amurland, may probably be a form of *S. dubitata*.

EUCOSMIA (SCOTOSIA) CERTATA, Hb.
Calocalpe certata, Meyr.

This species is found in Amurland, Isle of Askold, Japan, Yesso, and Central China.

Some of the Japanese specimens are strongly marked (var. *varia*, Hedem.). One male example from Ichang, Central China, which is very like a specimen in the series of *S. certata* from Japan in the National Collection, "has the central fascia of primaries well defined, the inner edge rather deeply indented towards costa, and the outer edge more than usually dentate."

EUCOSMIA (SCOTOSIA) UNDULATA, Linn.
Calocalpe undulata, Meyr.

Occurs in Amurland and Japan. The specimens are typical.

PHIBALAPTERYX TERSATA, Hb.
Eucymatoge tersata, Meyr.

Recorded from Japan and Central China.

The Japanese specimens "more nearly approach var. *tetricata*, Guen., than the type form, but they are not quite identical with either."

Var. *chinensis*, Leech.—" Smaller than typical specimens and rather redder in colour; less striated with white, and the submarginal white line is much obscured; there is a dusky shade before the second line of primaries and also one before the submarginal line, the latter is connected with an oblique streak from apex."

Phibalapteryx vitalbata, Hb.
Eucymatoge vitalbata, Meyr.

Occurs of the typical form in Amurland, Japan, and Western China.

Phibalapteryx (Cidaria) polygrammata, Bork.
Hydriomena polygrammata, Meyr.

Recorded from Amurland and Japan.

Collix (Phibalapteryx) sparsata, Hb.
Eucymatoge sparsata, Meyr.

There was a typical example of this species in the late Mr. Henry Pryer's collection, which is now incorporated in that of Mr. Leech. The specimen was from Oiwake in Japan.

Melanippe (Plemyria) hastata, Linn.

Found in Amurland and Western China.

Amurland specimens are referable to the typical form, but in Western China the species is represented by a specialised form, which Mr. Leech has named *chinensis* and described as follows:—" Basal half of all the wings black, traversed by three or four more or less interrupted wavy lines; outer margin broadly bordered with black, intersected by a wavy interrupted white line; intervening space white, intersected by a transverse series of black dots. Sometimes the secondaries are free from white markings on the black portions of the wing, and there are very few such markings on the primaries. Expanse 36–38 millim."

(To be continued.)

NOTES AND OBSERVATIONS.

Exhibition.—The North London Natural History Society will hold its Sixth Annual Exhibition, on Jan. 1st and 3rd, in the Lecture Hall of the North-east London Institute, Dalston Lane. Charge of the Entomological department will be undertaken by Mr. Louis B. Prout. Further particulars may be obtained from the Hon. Secretary, Mr. L. J. Tremayne, 4, Lanark Villas, Maida Vale, W.

Porthesia (Euproctis) chrysorrhœa a Pest in America.—In a special Bulletin of the Hatch Experiment Station, Massachusetts Agricultural College, bearing the date July, 1897, and entitled " The Brown-tail Moth," Messrs. Fernald and Kirkland give an account of the occurrence of *P. chrysorrhœa* in the State of Massachusetts, and refer to it as a new insect pest. It would appear that while entomologists in Britain are asked to deal gently with this species, the American State just mentioned has obtained an Act " to require local authorities to suppress the Brown-tail Moth."

PARASITES OF THE HESSIAN-FLY AND OTHER SPECIES OF CECIDOMYIA.—Mr. William H. Ashmead, in the November number of 'Psyche,' records six species of hymenopterous parasites bred from *Cecidomyia destructor*, two of which are described as new to science. *C. avenæ*, *C. tritici*, and the parasites affecting them are also referred to.

CRAMBUS PERLELLUS *var.* ROSTELLUS IN SCOTLAND.—Mr. Meyrick (Ent. Mo. Mag. (2), viii. 255) records the occurrence of this small yellowish-grey form of *C. perlellus* on the sand-hills near Gairloch, Ross-shire, in the early part of September last.

EPIONE PARALLELARIA (VESPERTARIA) IN SCOTLAND.—Mr. Hewett states (Ent. Mo. Mag. p. 255) that this species has been taken near the town of Hawick, Roxburghshire.

LARVA OF ENNOMOS AUTUMNARIA (ALNIARIA) IN KENT.—In connection with the remarks on *E. autumnaria* (*ante*, p. 297), it may be well to note that Mr. Geo. C. Griffiths records a larva of this species obtained at Walmer in August last. It was found on a wall in the Dover Road, and produced a female example of the moth on Sept. 21st (Ent. Mo. Mag. p. 255).

NOTES ON PHYTOMYZA NIGRICORNIS.—Like many more injurious insects introduced into New Zealand from Europe and America, the so-called cineraria fly (*Phytomyza nigricornis*) is now widely dispersed, and has become a serious pest in the colony. In some districts it is now almost impossible to grow good cinerarias without the foliage of the plants being seriously injured or quite destroyed by this leaf-miner. It also mines the leaves of the globe artichoke, causing disfigurement and premature decay of the foliage in autumn. It likewise mines the leaves of the common sow-thistle (*Sonchus oleraceus*), the dandelion, chrysanthemums, peas, and the native poro-poro (*Solanum aviculare*), the latter plant in a less degree than any I have mentioned. The leaves of the cineraria and sow-thistle have quite a beautiful appearance when they are closely mined by several larvæ working in the same leaf. When they attack the native *Solanum aviculare* they do not appear to be able to make much progress in the more fleshy leaves of this plant. In the case of cinerarias, I find dusting the leaves lightly with white hellebore powder to be a perfect preventive against the attacks of the fly. The phenomenally rapid and wide dispersion of *P. nigricornis* in New Zealand may be noted. In January last I was at the Rangitata gorge, and there observed the larvæ very numerous mining the leaves of the sow-thistles growing amongst the *débris*, and in the damp niches of the rocks. In July I was in the upper Opihi valley, and also observed the larvæ mining the thistles growing under the limestone rocks. It is likewise very common in all the more settled districts of the South Island. In the North Island it has for several years been giving considerable trouble to lovers of cinerarias, and in a lesser degree to chrysanthemum growers. Owing to the recent very dry mild winter in New Zealand, the larvæ continued to mine the sow-thistle leaves wherever the latter remained green and growing. It is at all times interesting to note the habits of introduced injurious insects, and their treatment of the indigenous plants. Up to the present time the *Solanum aviculare* is the only native plant I have noted attacked by *P. nigricornis.*—W. W. Smith; Sept. 28th, 1897.

Food-plant of the Larva of Tapinostola bondii.—Touching my note on the landslip of *bondii* locality (*ante*, p. 75), I find that I gave the food as *Arrhenatherum avenaceum*, whereas it should have been *Festuca arundinacea*. Tugwell was wrong, and Prof. Syme (Dr. Boswell-Syme) correct.—H. G. Knaggs; Folkestone, Nov. 23rd, 1897.

A curious use of Ants in Smyrna. — Mr. R. M. Middleton (Journ. Linn. Soc. Lond. Zool. xxv. 405) states that a Greek gentleman fell from his horse in Smyrna, and received a severe cut on the forehead above the right eye. "In accordance with the custom of the country, he went to a Greek barber to have the wound dressed, and the barber employed at least ten living ants to bite the two sides together. Pressing together the margins of the cut with the fingers of the left hand, he applied the insect by means of a pair of forceps held in the right hand. The mandibles of the ant were widely open for self-defence, and as the insect was brought carefully near to the wound, it seized upon the raised surface, penetrated the skin on both sides, and remained tenaciously fixed while the operator severed the head from the thorax, so leaving the mandibles grasping the wound. The same operation was repeated until about ten ants' heads were fixed on the wound, and left in position for three days or thereabouts, when the cut was healed and the heads removed. The ant employed is described by Mr. Issigonis [the gentleman referred to] as being about three-eighths of an inch long, very dark brown in colour, and of a particularly fierce disposition."

Eugonia fuscantaria and Ennomos quercinaria.—I notice that Mr. Kane, in his list of the Lepidoptera of Ireland (Entom. xxx. 59), mentions that there is a difficulty in distinguishing *E. fuscantaria* from the var. *infuscata* of *E. quercinaria*. I do not know to which particular variety the name *infuscata* refers, but I have never yet seen any specimens of *E. quercinaria* that could be confused with *E. fuscantaria*, and I have bred a considerable number of both species. Apart from the coloration, and the direction of the transverse lines, *E. fuscantaria* may be easily distinguished by the peculiar hooked angle on the hind margin of the primaries.—Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W.

Amphydasys betularia var. doubledayaria.—I was much interested regarding the capture by Mr. Mera of this variety in the London district, as I have this year, for the first time, bred an example (a male). Three larvæ were taken on willow near Mortlake, and one produced the black variety, the others typical specimens. — Alfred T. Mitchell; 5, Clayton Terrace, Gunnersbury, W.

Angerona prunaria: is the Larva a general feeder?—In a well-known habitat of the above species I have frequently searched and beaten for the larvæ, but without obtaining a single example; several of my friends have had a like experience both in Essex and the West of England; and I do not remember any mention of the larvæ having been beaten out in the numerous lists that have appeared in the

'Entomologist.' I had occasion this year to let the young larvæ choose their own pabulum; and very few plants in my greenhouse escaped their attention, and they were particularly partial to mint and *Nicotiana affinis*, also to ash, elder, fig, oleander, honeysuckle, wallflower, &c. Privet is really the best food for them, especially during hybernation, as the larvæ will feed in mild weather, and produce very early imagines. —ALFRED T. MITCHELL; 5, Clayton Terrace, Gunnersbury, W.

CAPTURES AND FIELD REPORTS.

NOTES AND OBSERVATIONS ON LEPIDOPTERA DURING THE PAST YEAR.—The following extracts from my note-book for 1897 may perhaps prove of some interest. When no locality is specially mentioned the district within a radius of ten miles of Birmingham is intended.

Pieris brassicæ has been very scarce during the past four years; this year, however, the species seems to have regained to a small extent its former abundance.

Pararge egeria. A few examples of the second brood were observed in Northamptonshire during September.

Lycæna argiolus. I came across this insect in the lanes, which abound to some extent with holly, around Yardley Wood and Shirley (about seven miles south-west of Birmingham). I fancy this locality is comparatively unknown, even to local collectors. This insect is very restricted in its range in the Midlands, Sutton Park (N. Warwickshire) being its head-quarters, but, curiously enough, only the early brood occurs there; this fact has been noticed by others. It also occurs around Coleshill and Malvern, and doubtlessly in a few other localities further away.

Sphinx ligustri. I found five larvæ of this species at Northampton, on or about Sept. 24th, one of which was full-grown, two were rather more than half so, and the other two were very small, but little more than an inch in length; hence these latter two must have come from a late and separate batch of ova, but surely an unusually late date. The first of the five pupated on Sept. 29th, and the last on Oct. 18th.

Smerinthus ocellatus, *S. tiliæ*, and *S. populi.* Larvæ of all three were plentiful at the beginning of September at Northampton,

Nemeophila (*Chelonia*) *plantaginis.* This insect was much scarcer than it usually is in Sutton Park; some examples show a tendency towards the var. *hospita.* I have never met with specimens showing any development of red from this locality.

Cossus ligniperda. Young larvæ swarmed around Norwich, attacking oak, elm, and ash, besides willow and poplar; but, strange to say, I only found three full-fed ones. I do not think many had spun up then.

Cerura vinula. Larvæ in abundance, and I have come across a great many cocoons lately; none were more than a foot from the ground.

Leucania lithargyria. This and *Phlogophora meticulosa* were the only insects taken at sugar here: though successful in other parts of the country, sugaring proved an absolute failure in this district.

Neuronia popularis. Swarms at gas-lamps; all males with the exception of a single female.

Hydrœcia micacea. At a light; September.

Mamestra persicariæ. Larvæ on mint and dock.

Triphæna ianthina. Beaten from hedgerows.

Tæniocampa gothica, *T. incerta*, *T. gracilis*, and *T. stabilis.* The commonest pupæ taken by digging, chiefly at roots of oak. They are very easy to find, being enclosed in no cocoon (or a very slight one) and do not penetrate deep into the earth.

Orthosia litura. Great numbers taken at sugar around Norwich and at Northampton, sometimes as many as seventy were met with in a single night; varies from dark brick-red to silvery grey.

Agrotis suffusa. At sugar at Northampton.

Xanthia aurago. At sugar near Norwich; in splendid condition.

Polia chi. On palings; is rather scarce and local in this district.

P. flavocincta. Great numbers, in perfect condition, at Northampton. Came to sugar soon after dusk; about half an hour later they began to draw off with unvarying regularity. I have noticed this elsewhere.

Amphipyra tragopogonis, Came across nearly two dozen, hybernating under a piece of loose bark high up on an oak, while hunting for Coleoptera. Very common at sugar at various places where I collected during September.

Catocala nupta. In very fine condition, at sugar, near Norwich.

Crocallis elinguaria. A solitary larva found feeding on currant (a very unusual food-plant) produced a female which laid about thirty ova, all of which, of course, soon shrivelled up.

Tephrosia crepuscularia. On tree-trunks, Sutton Park; May; all were very pale.

Ematurga atomaria. Common enough on the heaths, Sutton Park, but all males.

Hybernia progemmaria var. *fuscata.* Sutton Park.

Larentia didymata. The commonest Geometer of the year.

Eupithecia lariciata. Especially common about larches in Sutton Park.

Abraxas grossulariata. Larvæ observed feeding on hazel and sallow, nearly a mile from any garden.

Anaitis plagiata. A few specimens of the second brood taken at light near Norwich; ground colour more or less brownish, not grey.—Augustus D. Imms; "Linthurst," Oxford Road, Moseley, Worcestershire.

Colias edusa, &c., in Cornwall.—On October 18th we were favoured here with a brilliant sunny morning, warm, and with a light wind from the south-west. During a walk of a couple of hours I took, on the wing, *Colias edusa* (two fine males), *Pyrameis cardui*, *Polyommatus phlœas* (five in good condition), and *Pieris brassicæ* (two males). I also saw on the wing *Pieris rapæ*, *Pararge egeria*, *P. megæra*, and *Vanessa atalanta.* All the insects were in remarkably good condition. Is it not unusually late for *P. phlœas*, *P. egeria*, and *P. megæra?* Our climate is, of course, very mild.—W. A. Rollason; 13, Lemon Street, Truro, Cornwall.

Late Dragonflies.—Walking by the side of the Black Pond at Esher, in the beautifully warm weather that we experienced on Nov. 14th, I was agreeably surprised to find a few specimens of *Sympetrum striolatum*, disporting themselves in the sunshine over one corner of the pond. The deep coloration of their wings, as well as the ease with which they might be approached, testified to their advanced age; but, though veritable centenarians amongst this season's dragonflies, one female at least was busily engaged in oviposition. I had last seen the species at the same place on

Oct. 24th, when a few *Sympetrum scoticum* were also in evidence. On the same day (Oct. 24th) a fine male *Æschna cyanea* was picked up alive in a gutter at Kingston. Its colours faded very little in drying, possibly because it may not have been feeding much just previous to its capture. October 24th I look upon as a late date for dragonflies, and it may be guessed that I little expected to see any three weeks afterwards.—W. J. LUCAS, B.A.; 21, Knight's Park, Kingston-on-Thames, Nov. 15th, 1897.

COLIAS EDUSA, &c., AT FOLKESTONE.—At Folkestone, in the middle of October, while the guest of Dr. Knaggs, I availed myself of frequent opportunities of sugaring for Noctuæ in a part where success is generally to be met with. As the evenings were apparently most favourable, it was remarkable how few moths were attracted. *Phlogophora meticulosa* and *Miselia oxyacantha* together, a few worn *Cerastis vaccinii*, and *Catocala nupta* being almost the only species which presented themselves. Several entomologists of the neighbourhood had sugared during the earlier part of the month with similar results; and the beating of ivy bloom was not more productive. Such being the state of night-work, it was cheering to see a number of diurnal species such as *Vanessa atalanta*, *V. urticæ*, and *Chrysophanus phlœas*, disporting themselves over the rugged ground of the warren; and even more pleasing was it, when descending Baker's Gap, on the 30th of the month, to see a male specimen of *Colias edusa* fluttering by in the mid-day sunshine, It is rather a late date for the latter species to be abroad, and may therefore be worthy of record.—HENRY A. AULD.

ACRONYCTA ACERIS.—On Sept. 2nd last I was spending the day in London, and in the course of my wanderings found myself near West Kensington Station. I had to take shelter for a few moments during a very heavy thunder-shower; and on resuming my walk along a path bordered by a high black paling which divides part of the station from the road, I noticed, to my surprise, a full-fed larva of *A. aceris* attempting to ascend the paling. Out came the every-ready chip-box, into which I speedily transferred the larva, and had the satisfaction of seeing it spin up two days afterwards. Behind the paling was a solitary dismal-looking sycamore tree, from which the larva was doubtless shaken by the shower. Had I had the time and inclination to dirty myself by scrambling up the grimy paling and still grimier tree, I should probably have found more of its brethren. What singular taste could have led any self-respecting moth to lay its eggs in such uncomfortable quarters? Has this species been previously recorded in the metropolis? — H. W. SHEPHEARD-WALWYN; Bidborough, Tunbridge Wells.

[Larvæ of *Acronycta aceris* are not by any means uncommon objects, in their season, about gardens and squares in London. Several were observed this year in Chelsea and Kensington.—ED.]

ACRONYCTA AT LIGHT.—With reference to the Editor's note on *A. alni* at light (*ante*, p. 298), see 'Entomologist,' vol. xxiii. p. 262, and 'Record,' vol. iii. p. 132.—F. WHITTLE; 3, Marine Avenue, Southend, Oct. 10th.

NOTE FROM PORTLAND.—The following captures have been made here by me this season:—*Sphinx convolvuli*, eleven specimens between Aug. 14th and Sept. 16th. *Colias edusa*, five specimens (one var. *helice*) between Aug. 23rd and Sept. 13th. *H. hispidus*, fifty specimens between Sept. 2nd and 16th.—J. T. HYDE; The Grove, Portland.

ACHERONTIA ATROPOS IN LANCASHIRE.—In your excellent magazine, *ante*, p. 298, I saw a request from a Lancashire man for recent records of the occurrence of *A. atropos* in the county. Here are four records that have come under my direct notice:—Sept. 21st, 1895, one imago (captured), F. C. Thompson, Prescot. Sept. 28th, 1895, one imago (captured), R. Freeman, Prescot. Oct. 4th, 1895, one imago (seen), F. C. T. and R. F., Prescot. Sept. 3rd, 1896, one larva, H. B. Jones, Crosby. —(Rev.) R. FREEMAN; Prescot, Lancs., Nov. 10th, 1897.

VANESSA ATALANTA.—On Nov. 10th, while my brother and I were wandering through Mount Edgecumbe Park, Plymouth, we saw four perfect specimens of *V. atalanta* hovering round and settling upon the trunk of a small oak-tree. There was nothing very unusual in this, but one is always glad of a reminder of the summer when the cold of winter is setting in.—(Rev.) B. HARVIE-JELLIE; St. Helens, Lancs.

CHŒROCAMPA PORCELLUS.—As I have not heard of *C. porcellus* having been taken in Suffolk this year, I should like to record the capture of a specimen, after dark, in the neighbourhood of Ipswich.—E. PLATTEN; 2, Prospect Cottage, Bramford Road, Ipswich, Sept. 23rd, 1897.

MICRO-LEPIDOPTERA IN 1897.—Micros have been rather abundant in point of numbers, although not so in quantity of species. The following are the chief insects encountered:—*Halias chlorana*, plentiful, both as larvæ and imagines, but local; *Hypena proboscidalis*, *Botys verticalis*, *urticalis*, and *lutealis*; *Phyctænia* (= *Ebulea*) *sambucalis*, rather scarce; *Tortrix sorbiana*, *T. pyrastrana*, not very common; *T. viridana*, swarms (larvæ exceedingly destructive); *Phibalocera quercella*, *Dasycera sulphurella*, extremely common about currant bushes; *Spilonota roboraria*, a pest; *Incurvaria capitella*, *Alucita polydactyla*, *Pterophorus pentadactylus*.—A. D. IMMS; "Linthurst," Oxford Road, Moseley, Worcestershire, October, 1897.

ODONESTIS POTATORIA: ABERRATION OF THE FEMALE.—My friend Mr. Dolman has again bred a very remarkable series of *O. potatoria*, only two females being typical. The larvæ were collected in West Sussex.—ALFRED T. MITCHELL; 5, Clapton Terrace, Gunnersbury, N.

NOTES ON THE SEASON OF 1897.—The season for Lepidoptera, now fast drawing to a close, has, in the localities I have visited, been somewhat variable and contradictory as regards the numbers of individuals, some common species having been exceptionally abundant, whilst others only turned up sparingly. On March 13th I noticed a male *Gonopteryx rhamni* on the Cotswolds. I only tried the sallows on two or three occasions in the Clevedon district of Somerset, when certain species of *Tæniocampa* were fairly abundant. *Tephrosia crepuscularia* was seen on March 20th, and *Lycæna argiolus* on the 25th. On travelling down into South Wales the last week in April, *Pieris rapæ* appeared commonly in several places by the side of the railway. In Carmarthenshire, where I remained until early in July, this butterfly and *P. napi* were quite scarce. Some days in May being as cold as February may have affected them; on one occasion I noticed a specimen of *P. rapæ* quite benumbed. *Lycæna argiolus*, *Argynnis euphrosyne*, *Euchloë cardamines*, and *Pararge egeria* were, however, comparatively abundant. *L. icarus* emerged later than usual, doubtless affected by the cold temperature, but was not at any time so common as in some previous seasons. In June *Agrotis exclamationis* and *Xylophasia polyodon* swarmed at sugar, but other common Noctuæ were only in moderate numbers. On no occasion did I observe many of the Geometræ abundant. Larvæ of many species of Lepidoptera also appeared very scarce, quite different to the season of 1896, when some turned up continually. *Bombyx neustria* was this season, however, a notable exception. The greater part of July was spent in Breconshire, in the valley of the Wye. On the 12th I noticed a male *Euchloë cardamines*, *Argynnis aglaia* in some spots might be commonly seen, but *Argynnis selene* was then declining. During August and September I visited that delightful and wild part of Devon, the Dartmoor district, staying near the source and valley of the Teign at and near Chagford. The Diurni then out were in moderate numbers, *Pararge egeria* and *Epinephele tithonus* being the most abundant. *Vanessa io*, *V atalanta*, and *V. urticæ* might not unfrequently be seen at the heath and heather bloom, and I also saw an occasional *V. cardui.* Here, also, *Plusia gamma* frequently came for the sweets. Sugaring I only tried on two occasions, when absolutely nothing appeared. In September a female *Trichiura cratægi* was taken one evening flying, and about to deposit ova on the blackthorn. *Eugonia angularia* occasionally turned up, and the last brood of *Rumex cratægata. Macroglossa stellatarum* I watched one evening hovering over the blossom of a *Phlox* in a garden. During the past month of October, I have on many occasions tried the ivy-bloom with a friend, in the Cleveland district of Somerst; but, with the exception of *Anchocelis pistacina* and *Phlogophora meticulosa*, all the autumn moths have occurred sparingly. I have not heard of either *Sphinx convolvuli* or *Acherontia atropos* during the season. On one occasion only I noticed *Colias edusa*, a female specimen, at Tenby, on June 23rd.

On May 26th, in Wales, I observed *Argynnis euphrosyne* deposit ova on a species of *Veronica;* and on another plant, a *Hieracium* (?). These ova I forwarded to a friend who is making drawings of the ova of Lepidoptera. Are not the above-named plants uncommon as food for the larvæ? Our books usually give species of *Viola*, I believe.

Of other insects during the season, different species of dragonflies might frequently be seen, and several kinds of wild bees, commonly, but of wasps scarcely a dozen throughout the summer or autumn.—T. B. Jefferys; Bath, Nov. 2nd, 1897.

SOCIETIES.

Entomological Society of London.—*November 3rd*, 1897.—Mr. R. Trimen, F.R.S., President, in the chair. The President announced with regret the death of Mr. J. W. Dunning, formerly Secretary and President of the Society, and referred to his constant interest in it and zeal for its welfare. The Treasurer also spoke warmly of his great liberality towards the Society in times of financial straits, and of his successful efforts in procuring the Royal Charter, the cost of which he defrayed. Mr. Selwyn Image, of 6, Southampton Street, W.C., was elected a Fellow of the Society. Mr. J. J. Walker exhibited specimens of *Anisolabis annulipes*, Luc., an introduced species of earwig taken among bones at the chemical works at Queenborough, and of *Brachysomus hirtus*, Boh., a rare weevil, taken among dead leaves at Chatham. Mr. Janson exhibited a variety of *Melanargia galatea* of a clear yellowish cream-colour, without trace of the usual black markings. It was captured between Dover and Walmer in 1843, and was still in perfect condition. Lord Dormer showed a remarkable openwork cocoon of an unknown Japanese moth, constructed from the larval hairs. Mr. Jacoby exhibited fine examples of both sexes of the Australian Hepialids, *Charagria ramsayi*, *C. splendens*, and *Hepialus daphnandri*. Mrs. Nicholl exhibited a selection from the butterflies collected by her this year, in June and July, in the Albarracin Mountains in Aragon, containing several additions to the list of the district published in Madrid by Canon Zapater and Herr Max Korb. The species of greatest interest were *Erebia zapateri*, Oberth.; *Cœnonympha iphioides*, Staud.; *Satyrus prieuri*, Pier., and its fulvous female var. *uhagonis*, which was observed to be much more attractive to the males than the normal form was; *Argynnis hecate*, Esp.; and *Parnassius apollo*, L., of which a female variety occurred, with red-centred ocelli on the upper side of the fore wing. The Rev. H. S. Gorham showed examples of the following rare beetles from the New Forest:—*Notiophilus rufipes; Velleius dilatatus*, four specimens, of which two were found in copula; *Trichonyx sulcicollis;* and a single example of *Lytta vesicatoria* from Shirley Warren. Mr. Tutt showed a series of Noctuæ, taken at Romford by the Rev. W. Claxton, all of aberrant form; and for Mr. J. Merrin, a specimen of *Vanessa urticæ* with a silvery costal spot on the under side of the fore wings, a series of *Melitæa aurinia*, and an example of *Syrichthus malvæ* ab. *taras*, taken near Gloucester. Mr. Kirkaldy exhibited a complete series of species of the genus *Notonecta*, L.; specimens of the larva and imago of the very rare *Deinostoma dilatatum* (Say), from Arizona; and specimens of *Antipalocoris marshalli*, Scott, from Ceylon, which was previously recorded from Corsica alone. Papers were communicated by the President on "New or little-known Species of African Butterflies," and by Mr. E. Meyrick on "New Lepidoptera from Australia and New Zealand."

Nov. 17th.—Mr. R. McLachlan, F.R.S., Vice-President and Treasurer, in the chair. The chairman referred with regret to the death, while serving on the Indian Frontier Expedition, of Capt. E. Y. Watson, Fellow of the Society, and well known for his writings on Oriental Rhopalocera. Miss E. F. Chawner, of Forest Bank, Lyndhurst; Mr. F. N. Brown, M.R.C.S., of the Elms, Chobham, and Natal; Mr. Albert Harrison, F.C.S., of 72, Windsor Road, Forest Gate; Mr. Albert Norris, of Church Lane, Napier, New Zealand; Mr. Stephen Pegler, of Retford, Notts: Mr. Edward G. J. Sparke, B.A., of 1, Christchurch Villas, Tooting Bec Road, S.W.; and Mr. Wilmot Tunstall, of Brook House, Meltham, near Huddersfield, were elected Fellows of the Society. Mr. Selwyn Image exhibited male examples of *Pieris brassicæ*, with a black spot on the disc of the fore wings. They were bred from larvæ found feeding on *Tropæolum* at Lee, N. Devon, in the autumn of 1896, and six out of ten males showed this variation. He also showed a dark aberration of *Vanessa urticæ*, taken at Copthorne in Sussex; and exhibited two fine specimens of *Plusia moneta* taken at valerian, near Balcombe, Sussex, on June 30th, 1897. Mr. M. Burr exhibited three new species of Rumanian Orthoptera in illustration of a later communication. On behalf of Mr. T. D. A. Cockerell, of Mesilla, New Mexico, two specimens of *Synchloë lacinia* from that locality were exhibited, to show the remarkable forms of variation found in individuals occurring at the same time and place and on the same flowers. Mrs. Nicholl communicated a paper "On the Butterflies of Aragon," and Mr. Burr a "List of Rumanian Orthoptera." Mr. Tutt read a paper entitled "Some Results of Recent Experiments in hybridizing *Tephrosia bistortata* and *T. crepuscularia.*" — W. F. H. Blandford, *Hon. Sec.*

South London Entomological and Natural History Society.—*September* 23*rd*, 1897.—Mr. R. Adkin, F.E.S. President, in the chair. Dr. Chapman, F.E.S., Elmscroft, Red Hill, was elected a member. Mr. Malcolm Burr presented to the Society's museum an almost complete collection of British Orthoptera. Mr. Auld exhibited, series of *Tapinostola bondii*, from Folkestone; of *Caradrina ambigua*, from Devon, where it has been somewhat common this year; of *Dianthœcia nana*, from Shetland; and of *Tæniocampa gothica*, also from Shetland. Mr. Adkin, bred series of *D. nana* from Shetland larvæ, showing much variation. On behalf of Mr. de V. Kane, a specimen of *Larentia flavicinctata* taken in Antrim. Mr. Tutt, on behalf of Mr. Dutton, a very fine and variable series of *Abraxas sylvata* (*ulmata*). A good proportion of the specimens were smoky or partially smoky, and these seemed somewhat thinly scaled; and as they were slightly crumpled and difficult to set, Mr. Dutton had suggested that the aberrations were due to malnutrition. Mr. Tutt also showed three species of *Ascalaphus* which he had captured in the Southern Alps, together with two species of ant-lion. Mr. Burr, a specimen of *Phyllocrania illudens*, a mantis from Madagascar, with the leaves with which it is found. It is an extraordinary example of adaptation to surroundings, being very difficult to find even when attention is called to it in a small box. Mr. Turner, specimens of the hawk-fly, *Asilus crabroniformis*, from Seaton, Devon, and a series of the hemipteron, *Enoplops scapha*, taken over a very restricted area in the same locality on the leaves of coltsfoot. A paper was read entitled, "The British Day Butterflies, and the Changes in the Wings of Butterflies," communicated by Prof. A. Radcliffe Grote, A.M., in which he at some length explained his views as to the evolution of the venation, illustrated his remarks by, and applied his theory to, the British butterflies, criticised the work of Mr. Meyrick, and more fully explained himself to his own critics.

October 14*th*. — The President in the chair. Mr. Mansbridge exhibited varieties of *Abraxas grossulariata*, bred this season from Horsforth larvæ. The aberrant forms were not so numerous this year, but the line of variation was similar to that observed in former years, *viz.* a gradual suffusion of the fore wings with the black colour. Mr. South, two specimens of *Pieris rapæ* taken at Folkestone in September, by Mr. Sabine, each having a spot on the hind wings between veins 3 and 4; he noticed the same peculiarity in some specimens of *P. napi*, and said that the same variation occurred in some allied Chinese Pierids. Two specimens of *Callimorpha dominula* var. *rossica*, obtained from Dover by Mr. Sabine, and a bred series of *Acidalia inornata*, were also exhibited by Mr. South. Mr. H. Montgomery, on behalf of Mr. E. Montgomery, a series of bred *P. napi*, including specimens with traces of an additional spot, and read notes on the variation shown in the series. He also exhibited an aberrant specimen of *Epinephele tithonus* in which the ground colour was pale brownish buff, and the usual fulvous marking paler than in normal examples, and a specimen of *Abraxas grossulariata* having an additional complete band on the hind wings. Mr. McArthur, a specimen of *Arctia caia* with perforated wings, which had been caused by the larva changing to pupa on the sandy bottom of the cage, a piece of grit piercing the wing-case. There was also an indentation in the hind margin, perfectly ciliated, which had no doubt been caused by a similar obstruction. Mr. Cockerel communicated a note upon a peculiar case of protective coloration observed by him in Mexico. In a clump of orange composite flowers he saw a Vanessid pupa and a larva of a Sphinx about to change its skin. Mr. Ficklin, a series of *Polia flavicincta* from Cornwall, small, but brightly marked. Mr. Lucas, an immature form of a locust sent him from Kew Gardens. Mr. West, of Greenwich, series of the Hemiptera *Acanthosoma tristriatum*, from juniper bushes at Box Hill, and *Pantilius tunicatus*, beaten from hazel. Mr. R. Adkin, specimens of *Nonagria arundinis* (*typhæ*), bred, from Shoreham pupæ; one was of a reddish black, and another mahogany on the fore wings. He made some remarks upon the cleansing of the bodies of these and similar insects. A considerable discussion ensued on this subject.

October 28*th*.—The President in the chair. Mr. H. B. Brown, B.A., Hammersmith, was elected a member, Mr. Montgomery exhibited a long bred series of *Cidaria truncata* (*russata*). The parent was var. *centum-notata*, but none of those bred were of that form. Also a bred series of *Acidalia dimidiata* from July ova, and stated that some half a dozen larvæ were not feeding up, and apparently intended to hybernate; specimens of *Apamea ophiogramma*, bred from ova; and a *Cidaria corylata* which emerged the end of September. Mr. Newman, large first and second broods of *Arctia caia*, the former from larvæ taken around Darn, the latter from ova, and reared in a greenhouse. Considerable variation was shown, but only one of the more extreme dark forms and one of the yellow hind wing forms occurred. A small, very pale specimen was the most unusual form. Also bred examples of *Odonestis potatoria*, of various forms, from Darn; *Dryas paphia*, with white patches; *Argynnis adippe*, increase of dark markings, both from Goodwood; *Epinephele ianira*, two specimens with the usual fulvous colour quite white, from Singleton; and a bred *Smerinthus populi* of a very pink tinge. Mr. Tutt, on behalf of Dr. Riding and Mr. Bacot, a long series of the much debated Tephrosias, together with crosses, hybrids, mongrels, &c., and made remarks upon the results of their experiments; on behalf of Mr. Merrin, a long series of vars. of *Melitæa aurinia*, and a specimen of *Vanessa urticæ*, having an incipient silvery mark on the under sides of the fore wings; on behalf of Mr. Horne, an almost completely black var. of *Nemeophila plantaginis;* and on behalf of Mr. Griffith, a series of Tephrosias taken in the Bristol woods. Mr. Moore, a specimen of *Enodia portlandica*, from North America, and said that it did not seem right to place this species and *E. hyperanthus* in the same genus; also a specimen of *Locusta viridissima*, with its eggs, from Chambery. Mr. Adkin, vars. of *Argynnis selene* from Sutherlandshire; these were much duller than usual, and had large pale marginal spots. Mr. Merrifield, a very large number of specimens bred under extremes of temperature, to illustrate his *résumé* entitled, "Recent Examples of the Effect on Lepidoptera of Extreme Temperatures applied in the Pupal Stage."

November 11*th*.—The President in the chair. Mr. Tutt exhibited a number of *Psyche* cases, taken by Messrs. Edwards, Tunaley, and himself, in the Forest of Fontainebleau, including *Psyche unicolor* (*graminella*), *P. opacella*, *Epichnopteryx bombycella*, and *Fumea nitidella* (*intermediella*). Mr. Filer, a long series of mottled forms of *Nonagria arundinis* (*typhæ*) bred by Mr. Dennis and himself, from Surrey. Mr. Bishop, specimens of *Vanessa urticæ*, one having very large spots, and the other approaching var. *ichnusa*, both from Epping; *Agrotis exclamationis* with scarcely perceptible markings; *Melanippe fluctuata* having a broad marginal band dark, the inner area light, with the exception of a black costal blotch on the fore wings; and various varieties of *Fidonia atomaria*. Mr. Moore, the following Orthoptera from La Grande Chartreuse:—*Stetheophyma variegata*, *Decticus verrucivorus*, *Psophus stridulus*, *Stenobothrus geniculatus*, *S. declivus*, *Œdipoda fasciatum*, and others; and contributed interesting notes and observations. Mr. Adkin, bred specimens of a black variety of *Odontopera bidentata* from Westmoreland. Mr. Bishop reported that on Nov. 7th he found a female sallow bush on the North Downs in flower. Mr. Tutt read a paper entitled, "The Drinking Habits of Butterflies and Moths," and a long discussion ensued.—Hy. J. Turner, *Hon. Rep. Sec.*

Birmingham Entomological Society.—*September* 20*th*, 1897. Mr. R. C. Bradley in the chair. Mr. G. W. Wynn exhibited a nice series of *Tæniocampa opima*, bred from larvæ from the Cheshire coast; also the following insects, all bred, from Wyre Forest:—*Orgyia gonostigma*, *Notodonta trepida*, *Asphalia ridens*, *Geometra papilionaria*, *Amphidasys prodromaria*, and a nice little series of *Endromis versicolor*, raised from a colony of thirteen larvæ found; also *Leucoma salicis* bred from larvæ found near Coventry, a nice series of *Melanthia albicillata* from Sutton larvæ; and *Hecatera serena* found near Kidderminster. Mr. J. T. Fountain, a series of *Dianthœcia capsincola*, bred from larvæ found locally at Small Heath, &c.; also a specimen of *Lycæna argiolus*, small, and with the right wing bleached, the outer half being whitish and the basal half blue as usual; also a male specimen of *Lycæna corydon*, from Swanage, with the white of the hind marginal spots so much extended that on the fore wings the black was only left on the nervures, and on the hind wings the white appeared as large submarginal spots with small dark centres. Mr. R. C. Bradley, *Cynomyia mortuorum*, which he had taken the day before at Droitwich; he had not known of this species formerly in the Midlands. Mr. P. W. Abbott, a specimen of *Aporia cratægi*, taken by Mr. H. Douglas Stockwell near Dover, on June 22nd last; also, in conjunction with Mr. Albert J. Hodges, short series each of *Leucania albipuncta*, *Heliothis peltigera*, *Caradrina ambigua*, and *Laphygma exigua*, all taken in South Devon during August last. Mr. and Mrs. Abbott, and Mr. Hodges, between them secured twenty-four specimens of *L. exigua*, and three other entomologists working near them obtained the same number.

October 18*th*.—Mr. G. T. Bethune-Baker, President, in the chair. Mr. R. C. Bradley showed the following Diptera from Sutton:—

Machimus atricapillus, the first true Asilid he had seen there; *Helophilus trivittatus;* and *Cynomyia alpina*, a species which is marked doubtfully British in Mr. Verrall's list, but was confirmed by Mr. Grimshaw in the Annals of Scot. Nat. Hist. 1897, who took it in South Ayrshire. Mr. Bradley had taken twenty in his garden, all males; he said that it was so much like *Musca vomitoria* that it was probably overlooked on that account. Mr. A. H. Martineau, *Asilus crabroniformis* from Nevin, North Wales; also a smaller species of *Asilus*, with a *Lycæna alexis* in its grasp. Mr. Bethune-Baker, two drawers from his collection, containing a portion of the genus *Pieris*. Mr. P. W. Abbott, *Deilephila galii*, from Wallasey, where the larva was found this year by Mr. Victor Wilson; and a short series of *Lithosia caniola*, from South Devon, August, 1897. Mr. G. H. Kenrick read a paper upon "Mimicry," in which he pointed out all the difficulties of the present theories, and came to the conclusion that it was impossible for us to arrive at any positive conclusions until we had more evidence. He exhibited a large number of examples of Batesian and Müllerian mimicry, exhibiting both phenomena in a particularly perfect state.—Colbran J. Wainwright, *Hon. Sec.*

Cambridge Entomological and Natural History Society.—A meeting of the Society was held on Oct. 15th. Mr. Rickard exhibited a specimen of *Chærocampa celerio*, taken recently in Cambridgeshire, and an imago of *Carpocapsa saltitans*, reared from the so-called "jumping bean." He also exhibited some small ichneumons, bred from a probably deltoid larva; he said that they are peculiar in that they do not kill their host, and he believes that they inhabit the alimentary canal of the caterpillar, and escape by the anus. He has seen the caterpillar carrying the cocoon made by one of these larvæ, holding it with the anal claspers for some days, as if to incubate it. Mr. Farren exhibited a var. of *Dianthœcia conspersa* from Shetland, *Cidaria corylata* var. *albo-crenata* from Rannoch, and *Tæniocampa gothica* var. *gothacina* from Loch Laggan. Dr. Sharp exhibited several South American cocoons of two species, one bombycoid, the other psychid. One of the former contained a large ichneumon cocoon, in which again were smaller ones of another species, while two others had been used by a mason wasp and a leaf-cutting bee respectively to make their nests in. The psychid cocoons were tubular, about four inches long and half an inch thick, the females being largest, and it appeared that the female moths never leave the cocoon, for one of them was found hardly free from the large chrysalis, embedded in soft scales, and almost maggot-like in appearance. Although the larvæ spend a large part of their life in these cocoons, yet a large proportion were found to have been killed by parasites. Mr. Bedford exhibited three varieties of *Epinephele hyperanthus*, taken near Brockenhurst at the end of June; in the first, a female belonging to the "lanceolate" type, all the parts of each ocellus were correspondingly enlarged, the central pupil in some being considerably elongated; in the second, a male, the aberration affected the fore wings only, and consisted in a tendency for the yellow band of each ocellus to spread over the surface of the wing, forming irregular and asymmetrical blotches, the rest of the ocellus being quite normal; the third case was that of a male in which the right hind wing only was abnormal, both the black and yellow bands of all the ocelli, except that nearest to the anal angle, being so much enlarged as to run into one another, forming a black streak surrounded by yellow, covering the greater part of the wing and traversed by the wing rays, which were dusted over with yellow scales; the pupils of three of the ocelli were quite normal, that of the fourth (next to the costal margin) was barely visible.

A meeting of the Society was held on Oct. 29th. Mr. Fanen exhibited *Hesperia lineola*, from Burwell Fen; *Polia xanthomista*, from the Isle of Man; *Dasycampa rubiginea* (reared), from Reading, and *Aplecta occulta*, from Rannoch. Mr. Lefroy exhibited specimens of some salt-water insects from South Wales; a beetle (*Oxylebius legolesius*) and its larva; a rat-tailed maggot resembling *Eristalis;* and two Chironomid larvæ, with the pupa and fly of one of them. They live in small salt pools on the face of a cliff, about ten feet above high tide, the saltness of the water varying greatly from time to time. Dr. Sharp exhibited a small portion of the collection of Carabidæ made by Mr. Perkins in the Hawaiian Islands for a committee of the Royal Society and British Association. Seven or eight hundred specimens, representing five or six very closely allied forms, were shown. He stated that these forms were so extremely closely allied that it was reasonable to consider them as modifications of one species that had undergone change in connection with difference of locality. Some of the forms, however, were from the same island, so that it was not possible to consider the geographical isolation as the immediate or sole cause of the distinctions.

Nonpareil Entomological and Natural History Society.—*Annual General Meeting, October 7th*, 1897.—Officials elected for Session 1897–8:—President, Mr. Thomas Jackson; Vice-President, Mr. W. Stevens; Curator, Mr. W. Harbur; Secretary, Mr. F. West; Treasurer, Mr. H. Blake; Reporting Secretary, Mr. F. A. Newbery; Librarian, Mr. F. Craft; Trustees, Messrs. Huckett and Gurney; Committee, Messrs. Huckett, Gurney, Norman, Cooper, Moore, W. Harpur, Butt, Lusby, Samson, and Pickett. Mr. J. A. Clarke exhibited a choice and variable series of *Argynnis aglaia* taken at Bevendene, near Brighton. Among them were some fine forms, many being greatly suffused. Mr. Clarke contributed a nice box of insects to the Society's cabinet. Mr. Pickett exhibited three curious cocoons from Guildford; one taken last year had no opening; and of the other two (both taken this year), one had two openings—one at each end—and the remaining one contained three pupæ; also remarkable vars. of *Lycæna corydon*, taken at Dover on August Bank Holiday last. Two female specimens varied on the under side, one being larger than usual and had the black spots large in prpoortion. One under side was minus the black spots. Of the females there was a splashed var., one dwarf, another very dark under side, and a specimen in which the three spots on the under side were confluent, and formed a short black streak. Two examples of *Nemeophila plantaginis* taken at Folkestone, one being of the normal type, and the other a specimen in which the yellow on the under wings was replaced by bright red. Mr. Sampson exhibited a series of specimens, varying from light to dark, of *Eugonia angularia*, all bred from a female taken in Monk Wood.—F. A. Newbery, *Rep. Secretary.*

RECENT LITERATURE.

Life-Histories of American Insects. By Clarence Moores Weed, D.Sc. With 21 plates and many figures in the text. Pp. 278, sm. 8vo. New York and London: The Macmillan Company. 1897.

Comprises twenty-six non-technical essays on certain species or groups of species occurring in America. These appear to have been prepared with great care, and although written in simple language they are nevertheless generally scientifically accurate. The plates and figures in the text are admirable. Altogether the book is one that should prove both interesting and instructive, not only to American but also to British readers.

Report of the State Board of Agriculture on the Work of Extermination of the Gypsy Moth. Plates 6, pp. 85, 8vo. Boston: Wright & Porter. 1897.

Since 1893 something like 100,000 dollars have been received by the Committee each year from the State for carrying on the war against the moth, but this sum is not considered sufficient; and it is suggested that if the enemy is to be completely overcome an appropriation of not less than 1,575,000 dollars spread over a period of fifteen years, an average of 105,000 dollars per annum, will be required.

It certainly seems remarkable that while unsuccessful attempts have been made to turn down *Porthetria* (*Ocneria*) *dispar* in Britain, the most elaborate measures taken by Extermination Committees have failed to destroy this species in certain States of America where it has become established and is recognised as a pest. It is estimated that if the insect were allowed to spread it would do damage to the extent of one million dollars in the State of Massachusetts alone.

Proceedings of the Davenport Academy of Natural Science. Vol. vi. 1889–1897. Davenport, Iowa. 1897.

The Entomological papers comprised in this volume are: "A List of Coleoptera from the Southern Shore of Lake Superior, with Remarks on Geographical Distribution," by H. F. Wickham, M.S., and "Revision of the Truxalinæ of North America," by Jerome McNeill, with six finely executed plates, on which thirty-nine species and structural details are figured.

The following have also been received:—

Biological Effects of Civilization on the Insect Fauna of Ohio. By F. M. Webster. Reprint from the Fifth Annual Report of the Ohio State Academy of Science. Pp. 15.

The Protective Value of Action, Volitional or otherwise, in Protective Mimicry. By F. M. Webster. Pp. 67–77. Journal New York Entomological Society, June, 1897.

The Food Plants of Scale Insects (*Coccidæ*). By T. D. A. Cockerell. Pp. 725–785. Proc. U. S. Nat. Mus. vol. xix. Washington, 1897.

Further Coccid Notes; with descriptions of new species and discussion of points of interest. By W. M. Maskell. Pp. 293–331; plates xviii–xxii. Trans. N. Zeal. Inst. 1897.

Investigations on the San Jose Scale. Report to the New Jersey State Board of Agriculture, Jan. 13th, 1897. By Prof. JOHN B. SMITH. Pp. 24, illustrated. Trenton, N. J.: The John L. Murphy Publishing Co. 1897.

Directions for Collecting and Preserving Scale Insects (*Coccidæ*). By T. D. A. COCKERELL. Pp. 10. Washington: Government Printing Office, 1897.

OBITUARY.

JOSEPH WILLIAM DUNNING, M.A., F.L.S., &c.—Mr. J. W. Dunning died suddenly on Friday, the 15th of October last, at his residence, 4, Talbot Square, Hyde Park, W. He was born at Leeds in the year 1833, and was educated privately under tutors until 1851, when he entered Trinity College, Cambridge, as an undergraduate. Having taking the degree of M.A., he was shortly afterwards (in 1858) elected a Fellow of his College. In January, 1855, he was admitted a Law Student, and on the 26th January, 1861, he was called to the Bar by the Honourable Society of Lincoln's Inn. From that time until about five years ago he enjoyed a considerable practice as an equity draftsman and conveyancer, at No. 12, Old Square.

A few years ago he had a paralytic stroke, which partially deprived him of speech and obliged him to retire from the practice of his profession, and a second stroke which he had on October 15th last was the cause of his death.

In his early boyhood Mr. Dunning was a collector of Lepidoptera, and his name is familiar to most of us as being one of the first to capture in this country *Agrophila sulphuralis* (now known as *Emmelia trabealis*). Speaking of this species Mr. Stainton, in his 'Manual,' says, it "used to be a great rarity, but a schoolboy spending his summer holidays at Brandon having taken it, this insect found its way into all our collections, and Mr. Dunning 'awoke and found himself famous.'"

Mr. Dunning joined the Entomological Society in 1849, when a lad of sixteen years of age, the Linnean Society in 1860, and the Zoological Society in 1864. He was Secretary to the Entomological Society from January, 1862, to January, 1871, and was Vice-President several times—namely, in 1875, under the Presidency of Sir Sidney Smith Saunders; in 1877, under Professor Westwood; in 1879, under Sir John Lubbock; and again in 1890, under Lord Walsingham. In 1883 and 1884 he was President of the Society.

It is believed that Mr. Dunning had not many opportunities of giving attention to field natural history after his early boyhood; and his contributions to the Transactions and Proceedings of the Entomological Society are not numerous, but his Presidential Addresses were admirable in point of style. He was the compiler and editor, or at least one of the most active compilers

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and editors, of the 'Accentuated List of the British Lepidoptera,' published by the Entomological Societies of Oxford and Cambridge in 1858, and it is believed that he bore, if not the entire, at least the greater part of the cost of the publicationof this List.

His claim to the respect and esteem of all Fellows of the Entomological Society of London is mainly due to the warm interest which he always took in the affairs of the Entomological Society, and to the munificent donations which he constantly contributed to its funds. Over and over again, when the Society was in financial difficulties and the Treasurer's balance-sheet showed a deficit, Mr. Dunning came forward and paid the amount requisite to again place the Society on a proper financial basis. The writer of the present notice remembers that when he was first nominated Secretary, in January, 1886, the then Treasurer informed him that there was a serious deficit. Hearing this, he called on Mr. Dunning at his chambers, and told him the state of the Society's finances. On being furnished with the exact figures, Mr. Dunning at once drew a cheque for the required amount, nearly £40. Quite recently he sent, unsolicited, a donation to the Society of £45.

In addition to constant donations of money and books, Mr. Dunning, by his influence and energy, obtained for the Society its incorporation by Royal Charter in the year 1885. Knowing how many Societies in London, of at least equal importance to the Entomological Society, have failed to obtain a Charter, the Fellows of the Society cannot but feel deeply grateful to the deceased for having procured the Charter, and also for having paid all the fees and other expenses in connection with the grant of the same.

In private and professional life Mr. Dunning was a pleasant and genial companion. His generosity to his friends and associates was equal to that shown to the Entomological Society, with which he had been so long connected. He was a member of the Oxford and Cambridge, the Garrick, and other Clubs, and his *bonhomie* and high spirits made him popular with all sorts and conditions of men.—H. G.

We regret to announce the death of Mr. Neil McArthur, of Brighton, who died on Nov. 18th last, aged seventy-nine. For over forty years he had been interested in British Lepidoptera, and he was especially well acquainted with the species found in the neighbourhood of Brighton and the country for miles around. In 1859 he captured two of the three earliest known British specimens of *Lycæna bœtica*; these he took on the downs facing the sea on Aug. 4th and 5th. The other specimen, it may be mentioned, was taken by Mr. Latour on Aug. 4th of the same year near Christchurch. Although Mr. McArthur refrained from communicating his knowledge of insect-life to the public through the medium of the magazines, &c., he was always ready to give information to those who sought it.

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